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STEEL CONSTRUCTION

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Gas Stove Retailing.

[A paper prepared by MR. H. H. BEER, for Sixth Meeting, Canadian Gas Association.]

Having been requested to read a paper before this convention on gas appliances, I have taken for my subject, "Gas Stove Retailing."

First.—I would point out the necessity of it, and the advantages to the gas companies of doing it. The matter of most importance to all gas companies is to sell gas, and to do it successfully it is absolutely necessary to live up to the second word in the phrase, "Public Service Corporation." In a word, everything about your equipment must be both modern and efficient, all the way from your coal pile to the blue flame which boils the kitchen kettle. You lay your own pipes, you build or buy your holders, but neither will help if the range is a poor one, or incorrectly installed, and you will be blamed no matter who did it. It is the gas company or the meter that comes in for cuss words.

Have it right. That is the easiest way. Have the blue flame, and insure it by yourself installing a good gas range in the proper way. Going at this subject crab fashion, I will speak of installation before I talk of selling the stove. Here are the essentials; I put them on the canvas because they are vital. I say that word with authority. I know it this way, and I know it the other way—¼-inch pipe, vent pipe, stopcock. These things with a good range mean that this important department is tuned up; but my subject was selling, not installation.

To properly and successfully run a gas stove business, I would ask you to consider the points that are vital and absolutely necessary. These I will call essentials:

Location of show room.
An adequate display and demonstrating floor.
The proper line and variety.
An adequate sales and advertising organization.
Demonstrations. And an enthusiastic knitting together of all these elements.

The first of these, location, is apparent on the face of it, but there are a great many gas company show rooms, especially in some of the smaller towns, located on a side street, out-of-the-way of general traffic, and I cannot see why the gas company should not have the best stand in town. At least equally as good as a jeweler shop or a cigar store.

Second.—By display I mean the proper placing of goods on the floor. See that they are kept bright and shining; provide ample room for customers; arrange comfortable chairs for the tired lady to rest. Provide proper lighting; of course, we all know that artificial light is a better selling medium than the sun. Look at your own kitchen range in the afternoon and then at night. It looks $10 better after dinner, especially if the dinner has been a good one—and I might say that, properly installed, gas gives a better and more restful effect than any other artificial light. Light should be arranged with a view to showing the inside of the range as well as the outside. Have ample space to demonstrate the working of the range, showing its full efficiency when in operation; but, as for demonstration, we will say more of this anon.

Third.—Line and variety. In selecting a line, it is well to have one that the salesman will have confidence in, of modern get up, finished attractively, simple in construction. Of course, in my position this is rather a delicate subject, and I am inclined to voice the words of the Scotchman, who, when asked which was the best whisky, said it was all good—the only difference being that some was a little better than others. Anyhow, get the best. If you are in doubt as to selection, and wish my opinion, I should be only too glad to give it privately. As to variety, this is where many err. Too large a showing of styles is confusing to both the customer and salesman, and any retailer who endeavors to follow all the whims and vagaries of his many customers will eventually acquire as varied an assortment as a millinery store, which will have to be disposed of without the commensurate profit derived from said millinery. Select one or two lines and stay by them. Solidarity, efficiency, sanitary qualities, together with an attractive appearance, will carry the day.

Fourth.—Advertising and adequate sales organization. Advertising is a subject for a whole paper, so I am going to be fragmentary under this heading, and will speak of newspaper advertising first, for right here most of us go wrong. White space costs money, and, having bought it, most of us feel that the subject is disposed of; but if we sent out a road salesman, we would get the right kind of a man before we advanced travelling expenses. Copy for a newspaper,

copy that will bring people to your salesroom, is not easy to get. Ability to talk about stoves does not imply an ability to write an ad., and most men who write stove ads. could not sell a stove. Get a real advertising man to make your newspaper speeches for you. The words to be read by 5,000 or 50,000 people in your name should have worth, and the clever arrangement that only the professional ad. writer can bring.

Nobody could possibly read "Gas News" regularly without getting into harmony with the Consumers Gas Company. It breathes service, the real service we are all in the market for; and, incidentally, it puts consumers in touch with new ways of getting service, domestic or industrial, by using gas. Of course, it's worth the price. I notice that the Electric Company pays the Consumers Gas Company the sincerest form of flattery.

If you don't feel like tackling this completely, begin with envelope stuffers with the gas bill. The average manufacturer can be easily reduced to compliance with the proposition that he should supply them gratis, and thus it costs nothing but the initiative. Plan out all this advertising in advance of the season, with a regular appropriation, and then it will be done and well done.

Now let us analyze the things that go to make a sales' force efficient. We all know them well enough: Courtesy, a proper telling of the sales' story, and enthusiasm. Take that first heading, courtesy. To get it, in the superlative degree, in your sales' force is not easy, and it is a problem that is up to you to solve. Do you allow your salesmen when meeting a customer to select their own form of greeting, if such it may be called. Go out yourself and make any purchase, a necktie, let us say, and visit two competing stores. In one a clerk meets you with that hackneyed insult: "Were you wanting anything?" That always makes me feel like replying, "Oh, no; I am an escaped lunatic or a tax collector." And what chance has that place with the competitor across the way, who greets me with a bright smile, and "What can we do for you," in a tone of voice that implies, "If you even want to borrow our telephone, you are welcome." And if that chap has clean linen, a clean shave and clean shoes, he has made a good start anyhow. In Swift's and the National Cash Register Company they send home any office employee who turns up without these assets, and if they need them, so does a public service corporation. There are lots of people who can be weaned from electrical or other competition without argument; just a liberal use of that splendid lubricant, courtesy.

Now, about that secondly. We will assume a prospect to have been suavely greeted by a well-groomed representative of "Cook with Gas," conducted to a chair if possible, in front of a range—for your tired woman won't appreciate stove logic; and you are ready for the battle. It has cost you real hard, iron dollars for rent, advertising and other things, to arrange that combination. What is going to be said? Going to leave the nature of that message to a medium priced salesman? You have got to, partly, but you can help a lot. Let us glance at the psychology of stove selling. It is purely a question of overcoming some one major difficulty in the buyer's mind, otherwise she would say, "Send up that $35 stove," as soon as she was greeted; and a real salesman will find out in a short while whether it is a sense of pride, economy or efficiency which, when appealed to, will result in a trip for the delivery wagon. Take any article on your floor, get the reasons why it is best from a voluble manufacturer's representative, and prepare three selling talks, using all of the big features in each of them, but making your dominant note in each case strong on the pedal you have selected. If pride is evidently the characteristic to be titivated, a remark to the effect, "We feel sure that this will suit you, Mrs. B.; it is a duplicate of one we supplied to Lady Fitzbattleax, and will appeal even more strongly to a good housekeeper like yourself." No, I did not say to have the sales' force Irish; but don't ever overlook these tactics entirely in selling to ladies. Tiffany uses them and has thriven on them. The make-up of the other two selling talks is self-evident, but every statement made about the goods should be one of these points, and the judicious salesman will frequently use a combination of two (or even three) of these talks. And the convention and schooling of men are the great means for getting such machinery. But that is coming up again under the lastly of this preachment.

Enthusiasm—the touchstone of commerce or the fire that turns the dull talker into a salesman—the motto over the desk of all Eaton's managers, the grand quality that has put all you men into big jobs. How to get it into a retail sales force? You all know the principal things, a fair deal from the company, easy access to the boss for either complaint or suggestion, and an attentive hearing. Modern business has so universalized this that we all know it is essential, so I just mentioned it as the fundamental. Then competition among salesmen. I admire the method used by Mr. Kennedy in this connection. It is effective and his results show it, especially his method of adjusting the points on sales of lighting appliances. It is very comprehensive and effective. Speak to Kennedy about it; it is worth while.

Here is a thirdly. Offer a reward for extra efforts, and get it to the salesmen quick. Don't wait until the end of the year. Distant consequences don't have the result in these times, and a reward at the end of the year has about the same effect on a man's mind in May, as eternal punishment; but the end of the week, that's different. Suppose you offer a fraction of a cent fortaightly, for all points over a determined quantity representing average effort. A pat on the back, accompanied by a small extra check, just breeds enthusiasm, and as you can vary your point rewards as your stock varies, it helps wonderfully where you have too many of anything.

Of all means employed in giving publicity to goods, the greatest are practical demonstrations. They are greatly in vogue with all large departmental stores. About the best annual fair in the New England States is conducted in the Mechanics' Building in Boston every fall, and stove demonstrations carried on there are very successful. I would suggest to gas companies that they be prepared to give the prospective customer a practical demonstration at any moment. Have your showroom so arranged. I personally conducted several demonstrations this summer under difficult and annoying surroundings, some of them very ridiculous. At one place we found it would be impossible to make connections with the gas main—it was a natural gas town—and at the last moment had to bring the gas in a hose laid along the main street four doors away; the twists and turns necessary caused several leaks, the gas being of an extremely obnoxious variety made itself manifest to an alarming degree in that part of the town; and, incredible as it may seem, we actually sold the range to a nearby neighbor who came in to complain that the escaping gas was driving customers from his store. Really, you know, if you keep busy making people aware that you are alive, you are bound to do some business even if you are a nuisance. There is nothing else so attractive as a smart looking lady, in a white dress and white cap, sleeves rolled up, tending to the multifarious operations of baking, just inside the store door, or in a position easily seen by the passers-by. Here is something that attracts more than a passing glance; they come in, that is the main object. You invite them to sample some of the baking, and perhaps a cup of good coffee; place them in a comfortable chair and then proceed with a strong, well arranged selling talk. Possibly she has a range, but rest assured that you have done something. You have given her a suggestion how to do things a little different, and she will always remember where it was shown her. Everything counts that is done. I have never failed in making some sales at the demonstrations that we held this summer, and these were only one day stands in each town. They should not be less than a week, with special attention paid to the essentials necessary to make your demonstration a success, such as advertising before and during the time of demonstrating, both in the daily paper and by dodgers distributed from door to door. Ads. in the streets cars, and elaborate display of cards for show window, nicely arranged tables with cups and saucers, plenty of room and a comfortable seat. There really is something mighty attractive in nicely coked food turned out of the oven before our eyes, by an attractive demonstrator.

My lastly is an enthusiastic knitting together of these essentials. I am just going to mention it, for it is a big man's job, the most important element in the work of any general or department manager. It seems to me the development of two qualities in the medium grade man turn him into a high grade man. The first is best stated by quoting from Elbert Hubbard—he had it over the door of his workshop at East Aurora: "As for the habit of getting ready for a quick scoot for the door when the whistle blows, this does not mean for you a raise; work as if you owned the place and perhaps you may." The other is harmony, team work, co-operation. Without these any business is a nightmare, and no lasting results can be accomplished. Now, to preach these things and to drill in the elements covered in sales' department organization, the convention is vitally important. A convention always does either a lot of good or a lot of harm. If one does not organize for it, it may become the clearing house for all the discontent and bile in the organization; but if the manager gets ready and recoguizes it as perhaps the most important thing he has to look after, great good can be accomplished.

Calorific Power of Coals.

The Joint Committee on Coal Analysis of the American Society for Testing Materials, and the American Chemical Society, has issued a preliminary report. The greatest difficulty seems to have been to find means of accurately determining the moisture content. Coals are so sensitive to changes of humidity that it is impossible to obtain the same results for moisture in a given coal, if the examinations are made in different places, or even at different times, in the same place. Most analysts do not realize the moisture changes that can occur during the transfer of the coal from retaining vessels to the drying receptacles and during the weighing. The report describes approximate methods and methods of greater accuracy for determining moisture, volatile matter, ash, sulphur and calorific power, each problem having been handled by a special sub-committee. The text of that part of the report, covering the determination of calorific value, is appended:

The specifications are to be of two classes. The procedure specified under (a) may be followed in tests where a tolerance of at least 1 per cent. is allowed; that under (b) is to be used in all cases where the limit of tolerance is less than 1 per cent., and is to be followed in all cases of dispute. Under (b) any three determinations made at the same time on the same sample may be required to fall within a range of 0.3 per cent.

Combustion Bombs.—The Atwater, Emerson, Mahler, Peters, Williams or similar bombs may be used. For (a) the lining material of the bombs need not be specified. The Parr calorimeter may also be used, but only on condition that both parties to the contract agree to its use. For (b) the bomb shall have a lining of platinum, gold, porcelain enamel or other material which is not attacked by nitric and sulphuric acids, or other products of combustion.

Calorimeter Jacket.—The calorimeter (except the Parr) must be provided with a water jacket, having a cover to protect the calorimeter from air currents. The jacket must be kept filled with water. For (b) the water in the jacket must be kept within 2° or 3° of the temperature of the room and should be stirred continuously by some mechanical stirring device.

Stirring of the Calorimeter Water.—The water in the calorimeter must be stirred sufficiently well to give consistent thermometer readings while the temperature is rising rapidly. The speed of stirring should be kept constant. For (b) a motor driven screw or turbine stirrer is recommended, and the speed should not be sufficient to hold the temperature of the calorimeter more than 0.3° or 0.4° C. above that of the jacket, when the stirrer is allowed to run continuously. Accurate results cannot be obtained when too much energy is supplied by the stirring device or when the rate of stirring is too irregular. The portion of the stirring device immersed in the calorimeter should be separated from that outside by nonconducting material, such as hard rubber, to prevent conduction of heat from the motor or outside air.

Thermometers.—Thermometers used shall have been certified by a government Testing Bureau and shall be used with the corrections given on the certificate. This shall also apply to electrical resistance or thermoelectric thermometers. For (b) correction shall also be made for the temperature of the emergent stem of all mercurial thermometers, and for the "setting" of Beckmann thermometers. For accurate work either Beckmann or special calorimetric thermometers graduated to 0.01° or 0.02° are required. Such thermometers should be tapped lightly just before each reading to avoid errors due to the sticking of the mercury meniscus, particularly when the temperature is falling. A convenient method is to mount a small electric buzzer directly on the top of the thermometer and connect it up with a dry cell and a push-button. The button should be pressed for a few seconds immediately before each reading.

Oxygen.—Oxygen used for combustions shall be free from combustible material, and for (b) it shall not contain more than 5 per cent. nitrogen and argon together. The total amount of oxygen contained in the bomb for a combustion shall not be less than 5 grams per gram of coal. But the combustion must be complete as shown by the absence of any sooty deposit on opening the bomb after firing.

Firing Wire.—The coal in the bomb may be ignited by means of either iron or platinum wire. If iron wire is used, it should be of about No. 34 B. & S. gauge, and not more than 10 cm. (preferably 5 cm.) should be used at a time. A correction of 1,600 calories per gram weight of iron wire burned is to be subtracted from the observed number of calories. Except, however, that this correction may be omitted from both the standardizations of bomb, and coal combustions, provided the same amount of wire is used in all cases.

Standardization.—The water equivalent of a calorimeter can best be determined by the use of standard substances such as the standard combustion samples supplied by the Bureau of Standards. The required water equivalent is equal to the weight of the sample, multiplied by its heat of combustion per gram and divided by the corrected rise in temperature.

The calorimeter shall be standardized by the combustion of such standard samples supplied by the Bureau of Standards, and used according to the directions given in the certificates which accompany them. A standardization shall consist of a series of not less than five combustions of either the same, or different standard materials. The conditions as to amount of water, oxygen, firing wire, method of correcting for radiation, etc., under which these combustions are made shall be the same as for coal combustions. For (b) in the case of any disagreement between contracting parties a check standardization shall be made at the time of test, but such standardization may consist of two or more combustions of standardizing samples.

Manipulation: 1. *Preparation of Samples.*—The ground sample, which is in approximate moisture equilibrium with the atmosphere, is to be thoroughly mixed in the bottle, and an amount, approximately 1 gram, is to be taken out and weighed in the crucible in which it is to be burned. Coals which are likely to be blown out of the crucible should be briquetted. Standardizing samples are also to be briquetted. After weighing, the sample should preferably be immediately placed in the bomb and this closed. This procedure is necessary to avoid sublimation when naphthaline is used.

2. *Preparation of the Bomb.*—The firing wire, if iron, should be measured and coiled in a small spiral and connected between the platinum terminals, using, if necessary, a piece of platinum wire somewhat heavier than the iron wire, to make the connection. The platinum and the iron must both be clean. About ½ cc. of water should be placed in the bottom of the bomb to saturate, with moisture, the oxygen used for combustion. When the crucible is put in place in the bomb, the firing wire should touch the coal or briquet of standard material. For the combustion of standardizing samples iron wire is preferable to platinum.

3. *Filling the Bomb with Oxygen.*—Oxygen from the supply tank is to be admitted slowly to avoid blowing the coal from the crucible, and the pressure allowed to reach 20 atmospheres, for the larger bombs, or about 30 atmospheres for the smaller bombs, so that the bomb shall contain an amount of oxygen sufficient for complete combustion; viz., at least 5 grams per gram of coal, or other combustible. When feasible, the bomb may be exhausted before filling to remove the nitrogen of the air, thus reducing the amount of the nitric acid formed.

4. *Calorimeter Water.*—The calorimeter is to be filled with the required amount of water, depending upon the type of calorimeter. The amount may be determined either by measurement in a standardized flask or by weighing; for (b) distilled water should be used and the amount determined by weighing. The amount must be kept the same as that used in standardization of the apparatus, or a correction applied for the difference in weight.

5. *Temperature Adjustments.*—The initial temperature in the calorimeter should be so adjusted that the final temperature, after the combustion, will not be more than 1°, preferably about ½°, above that of the jacket, under which conditions the total correction for heat gained from or lost to the surroundings will be very small when the rise of temperature is 2° or 3°, and the effect of evaporation will also be small.

6. *Firing Current.*—The electric current used for firing the charge should be obtained from storage, or dry cells having an e. m. f. of not more than 12 volts. The circuit should be closed by means of a switch which should remain closed for not more than 2 seconds. When possible, it is recommended that an ammeter be used in the firing circuit to indicate when the firing wire has burned out. For (b) the e. m. f. of the firing battery shall not exceed 12 volts, since a higher voltage is liable to cause an arc between the firing terminals, introducing additional heat, which cannot be measured with certainty.

7. *Method of Making an Observation.*—The bomb when ready for firing is to be placed in the calorimeter, the firing wires connected, the cover put in place, and the stirrer and thermometer so placed as not to be in contact with the bomb or container. The stirrer is then started, and after the thermometer reading has become steady, not less than 2 minutes after the stirrer is started, temperatures are read

at 1-minute intervals for 5 minutes, and the charge is then fired, noting the exact time of firing. Observations of temperature are then made at intervals depending upon the method to be used for computing the cooling correction. When the temperature has reached its maximum and is falling uniformly, a series of thermometer readings is taken at 1-minute intervals for 5 minutes, to determine the cooling rate.

8. *Titration.*—After a combustion the bomb is to be opened, after allowing the gas to escape, and the inside examined for traces of unburned material or sooty deposit. If these are found the observations shall be discarded. If the combustion appears complete, the bomb is to be rinsed out, and the washings titrated to determine the amount of acid formed. A correction of 230 calories per gram of nitric acid should be subtracted from the total heat observed. If the sulphur content of the coal is determined, the amount of sulphuric acid should be computed, and an additional correction of 1,220 calories per gram of H_2SO_4 should be subtracted, for the excess of the heat of formation of the sulphuric acid over that of nitric acid.

Computation of Results.—The following method of computation is recommended, to take the place of the Pfaundler, or other similar formulas, for computing the cooling correction (radiation correction).

Observe (1) the rate of rise (r_1) of the calorimeter temperature in degrees per minute for 4 or 5 minutes before firing, (2) the time (a) at which the last temperature reading is made immediately before firing, (3) the time (b) when the rise of temperature has reached six-tenths of its total amount (this point can generally be determined by adding to the temperature observed before firing, 60 per cent. of the expected temperature rise and noting the time when this point is reached), observe (4) the time (c) of a thermometer reading taken when the temperature change has become uniform some 5 minutes after firing, (5) the final rate of cooling (r_2) in degrees per minute for 5 minutes.

The rate r_1 is to be multiplied by the time $b-a$ in minutes and tenths of a minute, and this product added (subtracted if the temperature were falling at the time a) to the thermometer reading taken at the time a. The rate r_2 is to be multiplied by the time $c-b$ and this product added (subtracted if the temperature were rising at the time c and later) to the thermometer reading taken at time c. The difference of the two thermometer readings thus corrected, provided the corrections from the certificate have already been applied, gives the total rise of temperature due to the combustion. This multiplied by the water equivalent of the calorimeter gives the total amount of heat liberated. This result, corrected for the heats of formation of nitric and sulphuric acids observed, and for the heat of combustion of the firing wire when that is included, is to be divided by the weight of the charge, to find the heat of combustion in calories per gram. Calories per gram multiplied by 1.8 give the B.T.U. per pound. The results should be reduced to calories per gram or B.T.U. per pound of dry coal, the moisture being determined upon a sample taken from the bottle at about the same time as the combustion sample is taken. For an accurate comparison of different coals from the calorimeter determinations, it is evident that the results should be reduced in each case by the heat of evaporation (preferably at 20° C.) of the water formed by combustion of the coal, since in the bomb this water is condensed and the heat of condensation is included in the measurement, while in nearly all commercial conditions the water vapor passes off uncondensed and the heat is lost. On account of the additional time required to determine the hydrogen content of the coal samples, the correction necessary to reduce to the above basis or "net" heat of combustion is not generally applied, although it may amount to several per cent. in extreme cases.

Combustion of Anthracites and Coke.—For anthracites and coke, which have a high ash content and do not readily burn completely, the following procedure is recommended: The inside of the crucible is lined completely with ignited asbestos in a thin layer pressed well down into the angles. The coal is then sprinkled evenly over the surface of the asbestos. Otherwise the procedure is as previously described.

Parr Calorimeter.—The essential conditions for the operation of the Parr or peroxide calorimeter are as follows: The coal should be finely pulverized. While 60-mesh is sufficient for bituminous coals, anthracites should be ground to at least 100 mesh. The sodium peroxide used should be received in solder-sealed tins, and of a size suitable for emptying completely into the container for use, preferably a glass jar with lever-sealed cap.

In addition to the reaction, the peroxide serves as a diluent, and the ratio necessary for a quiet reaction should be maintained, preferably 0.5 gram of coal to approximately 10 grams of peroxide. One gram of pulverized potassium chlorate is also used to advantage. It is first thoroughly mixed with the coal in such a manner as to avoid any possibility of lumping of these two substances. A thorough and uniform mixing with the peroxide is then assured by shaking in the closed cartridge.

EXAMPLE.

Observations.

Water equivalent 2,550 g.

Weight of charge 1.0535.

Approximate rise of temperature 3.2°.

60 per cent. of approximate rise 1.9°.

Time.	Temp.	Corrected Temperature.
10–21	15.244°	(Thermometer corrections from the certificate.)
22	.250	
23	.255	
24	.261	
25	.266	
(*a*)26	.272	15.276°
		Charge fired.
(*b*)27–12	17.2°[1]	

[1]The initial temperature is 15.27°; 60 per cent. of the expected rise is 1.9°. The reading to observe is then 17.2°.

(*c*)31	18.500°	18.497°
32	.498	
33	.497	
34	.496	
35	.494	
36	.493	

Computation.

$r_1 = 0.028° \div 5 = 0.0056°$ per minute. $b-a = 1.2$ minutes.

The corrected initial temperature is

$15.276° + 0.0056° \times 1.2 = 15.283°$.

$r_2 = 0.007 \div 5 = 0.0014°$ per minute; $c-b = 3.8$ minutes.

The corrected final temperature is 18.497° + 0.0014 × 3.8	=	18.502°
Total rise 18.502° — 15 283°	=	3.219
Total calories 2,550 × 3.219	=	8,209
Titration, etc	=	—7
Calories from 1.0535 grams coal		8,202
Calories per gram	7,785	
Or B.T.U. per pound	14,013	

In practice, the time $b-a$ will be found so nearly constant for a given calorimeter with the usual amounts of fuel, that b need be determined only occasionally.

ALLOWABLE VARIATIONS.

	Per Cent.		Per Cent.
Same analyst	0.3	Different analysts	0.4

Coals with moisture above 2 or 3 per cent. must be oven-dried at 110° C., in the usual manner, after weighing out, and before mixing with the chemicals. The correction factors to be subtracted are as follows:

	Degs. C.
For each per cent. of ash	0.00275
For each per cent. of sulphur	0.005
For 1 gram of $KClO_3$	0.130
For electric fuse wire	0.008
For oxygen of bituminous coals for 0.5 gram	0.025
For oxygen of brown ligdites for 0.5 gram	0.050
For oxygen of benzoic acid for 0.5 gram	0.124

The products of combustion, CO_2 and H_2O, combine with the chemical with the formation of heat, which amounts in each case to 27 per cent. of the total heat of the reaction. The corrections for ash, fuse wire, etc., in terms of the temperature rise together with radiation and thermometer corrections, must first be subtracted from the indicated rise in temperature. The formula for the final calculation then becomes.

$$\frac{\text{Corrected thermometer rise} \times 0.73 \times \text{total water}}{0.5 \text{ gram coal}} = \text{calorific value.}$$

THE Coleman Gas Producer Company, of New York, has been incorporated by Messrs. Williams (Jersey City, N. J.), Henry G. Wenzel (Brooklyn, N. Y.), and Joseph Gerradt, New York. It is capitalized in $1,000,000, which would seem sufficient.

The Dodge Coal and Coke Handling Installation, Lima Station, Indiana Lighting Company.

The accompanying illustrations show a late example of the Dodge coke and coal handling apparatus as installed in the plant of the Lima (O.) division of the Indiana Lighting Company. The entire equipment was designed, put together, made and erected by the Dodge Company's engineers. The material to be handled is received at the plant in dump-bottom cars (*A*) on trestle (*B*). From track hopper (*C*), 19 feet wide, 16 feet long and 16 feet deep, the coal or coke is conveyed to a bucket elevator (*D*) by a Dodge-Zimmer conveyor (*E*), 24 inches wide, 13 feet 6 inches in length. A crusher, in combination with the elevator and conveyor, may be operated at will, in the reducing of material to any required size.

Fig. 1.—Lima (O.) Gas Works. Coal and Coke Handling Outfit.

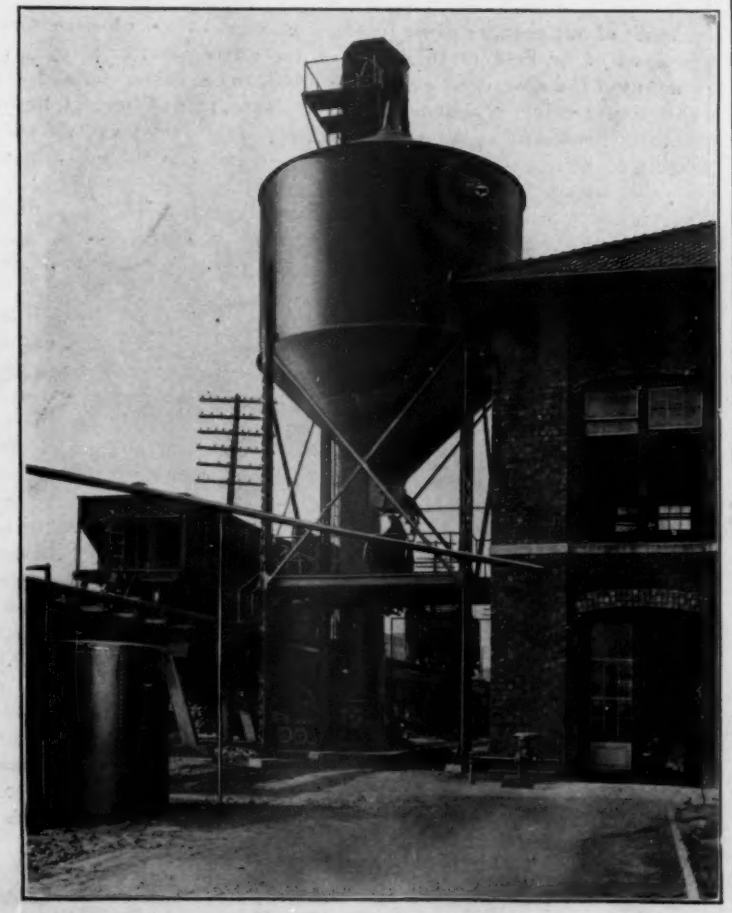

Fig. 2.—Lima (O.) Gas Works. Coal and Coke Handling Outfit.

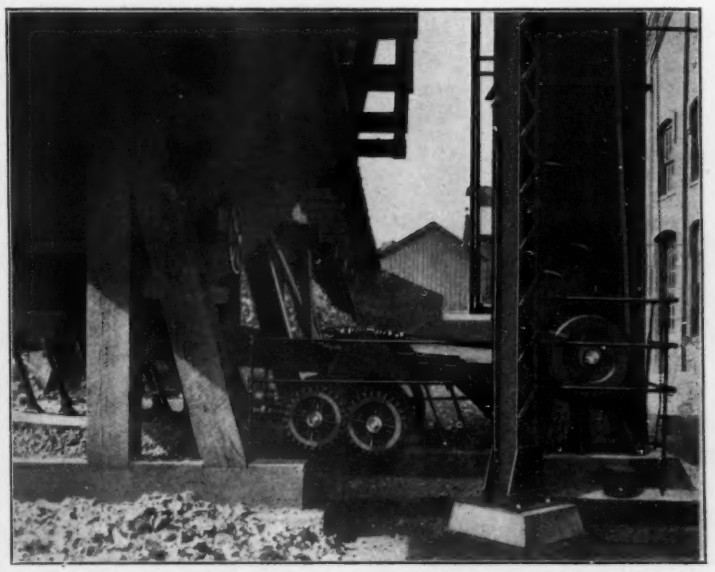

Fig. 3.—Lima (O.) Gas Works. Coal and Coke Handling Outfit.

The elevator, with 74 feet centers, carries malleable buckets, 14 by 8, on interlocking, riveted, pintle chain. It has a steel head and legging, and the elevator is so constructed that coke may be delivered to the storage bin and coal to the boiler house through a system of spouting (*F*), by means of a switch valve at the head.

The storage tank (*G*), which has a capacity of many tons, is 22 feet in diameter and 14 feet high, with conical top and bottom. The storage spout (*H*) is fitted with cased iron gear and lever-operated clam, the valves being arranged to close easily against the flow of material. Coke is loaded into charging barrows (*I*), by which it is delivered to the gas machine.

Mr. W. I. Battin, Chief of the engineering department, Indiana Lighting Company, Lafayette, Ind., writing to the Dodge Manufacturing Company in reference to this installation, said:

"We are greatly pleased with our coke and coal handling outfit, and find that, in the mechanical arrangement for fitting the elevator below the trestle, the coke cars can be simply dumped as received, the coke being put into storage without re-handling, and then taken out of the tank as needed by the gas machine. Even if three or four cars of coke come in a bunch they can be taken care of easily. The crusher, working in connection with the conveyor, enables us to use steam coal of mine run size and partially cracked for boiler room purposes. There is no question about the outfit being extremely efficient and economical. We are glad to recommend it."

English National Gas Congress and Exhibition.

In connection with the conferences to be held during the Congress, which opens in London, Oct. 1, the following papers are announced:

"Planning, Buying, and Cooking for the Working Man's Table."—Hints as to food values, relative costs, and economical cooking methods. By C. Herman Senn, Hon. Director of the Cookery and Food Association.

"The Cookery Class in its Relation to the Home."—How to improve the working man's table through the working man's child, and thereby raise the standard of national health and physique. By Miss Mable Atkinson, M.A.

"The Penny in-the-Slot Meter as the Working Man's Friend."—How to get the greatest cooking value for a penny. By Mrs. Margaret M'Killop, M.A., Sommerville College, Oxford.

"Smoke as a Destroyer of Fine Art." By Sir William Richmond, K.C.B, R.A.

"The Loss to Health and Pocket Caused by the Smoke Nuisance."—The Question of Remedies. By Sir William H. Bennett, K.C.V.O., F.R.C.S.

"The Gas Industry in Relation to Smoke Abatement." By Professor Vivian B. Lewes, F.I.C., F.C.S.

"What the Coal Smoke Abatement Society has done and What it Could do." By H. A. Des Vœux, M.D., etc. (Treasurer of the Coal Smoke Abatement Society).

"The School of the Future."—Its lighting, heating and ventilation. By Septimus Warwick, F.R.I.B.A., and Austen Hall, F.R.I.B.A.

"Some Considerations on the Apparent Brightness of Light." By Professor Sylvanus Thompson, D.Sc., F. R.S., etc. (President of the Illuminating Engineering Society).

"The Hygiene of Gas for Lighting."—Notes on research upon the hygienic value of gas as an illuminant. By Samuel Rideal, D.Sc., F.C.S., etc.

"The Health Value of Radiant Heat."—Notes on research upon various types of heating appliances, having special regard to the comparative health values of heating by convection and by radiation. By Professor Leonard Hill, M.B., F.R.S., etc.

"Modern Improvements in Gas Lighting and Heating Appliances." By Professor Vivian B. Lewes, F.I.C., F.C.S.

"Light and Sight."—The effect of wrongly-placed and unshaded lights on the eye. By Meredith Young, M.D., D.P.H., etc.

"The Economy of Efficient Lighting."—Good lighting as an aid to increased output and a safeguard against accident. By Franklin Thorp.

"The Aims and Objects of the Illuminating Engineering Society." By Leon Gaster (Hon. Secretary of the Illuminating Engineering Society).

"Domestic Service as a Career for Gentlewomen."—How the substitution of gas for coal affects the domestic service problem. By Mrs. M. A. Cloudesley Brereton, Officier d'Académie.

"Fuel and Light in the Working Man's Budget." By Mrs. Margaret M'Killop, M.A.

"Coal Gas as a Fuel for Domestic Purposes." By F. W. Goodenough, Chairman of Exhibition Executive. (Based upon Cantor Lectures delivered before the Royal Society of Arts, March, 1913.)

"Co-Partnership as a Means of Increasing the Prosperity of Both Capital and Labor." By Aneurin Williams, M.A., J.P.

"The Relation of Science and Industry."—An account of the work of the Imperial College of Science and Technology. By Surg.-Gen. Sir Alfred Keogh, K.C.B., LL.D., etc.

"Co-operation Between the School and the Employer." By Cloudesley Brereton, M.A., and D. Milne Watson, M.A., LL.B.

"Natural Law in the Commercial World." By A. F. Sheldon.

"The Lighting, Heating and Ventilation of Factories and Workshops." By Professor Vivian B. Lewes, F.I.C., F.C.S.

"Gas as a Fuel for Industrial Purposes." By Professor W. A. Bone, D.Sc., F.R.S.

"The Economic Value of Adequate Illumination." By Leon Gaster (Hon. Sec. of the Illuminating Engineering Society).

A programme of popular and scientific lectures is also in course of preparation; and it is proposed to deal with the following subjects:

"How Gas is Made and Distributed."
"How Gas is Measured."
"The Making of a Gas Mantle."
"The Use and Abuse of Light."
"The History of Fire Making."
"Power and Heat for Factory Use."
"The Silent Servant. (Gas in relation to the Servant Problem.)"
"A Pennyworth of Gas. (The Slot Meter as the Worker's Friend.)"
"A Bowl of Water. (The subject of radiant *versus* convected heat.)"

The Pennsylvania Public Service Company Law.

What is officially designated as the "Public Service Company Law," passed by the legislature of Pennsylvania was approved July 26, by Governor Tener. In addition to establishing a commission having jurisdiction over public utility services and businesses, it provides for a limited control over municipal utility departments, for the control of railway (and other utility) crossings, for the abolishing of the old railroad commission and the repeal of conflicting legislation.

The act defines a public service company so as to include all the usual utilities and common carriers, and also stage-line, express, baggage transfer, pipe-line, ferry, sleeping-car, dining-car, tunnel, turnpike, bridge, wharf, inclined-plane, grain elevator, telegraph and telephone, natural gas, heating, refrigerating, and sewage corporations, and all persons engaged for profit in any such business.

The law requires public service companies to furnish, without discrimination, safe and reasonably adequate service at reasonable rates. All tariffs, schedules, rules, contracts, leases, reports, must be filed with the commission. No changes in any tariff or schedule are to be made, except after 30 days' notice to the commission and to the public, unless the commission consents to a shorter time. Rates once fixed by the commission are not to bo changed for 3 years without approval.

A further imposed duty is the adoption and use of uniform systems of accounts and records, as prescribed by the commission, carrying no charges in any operating account which can properly be classed as capital, and *vice versa*, and carrying proper and reasonable depreciation. Uniform accounts, depreciation reserves, etc., are required of all municipal corporasions with respect to their public utility departments.

Companies must furnish the commission all maps, profiles, engineers' reports, etc., of any aid in valuation of property, and co-operate with the commission in the valuation. The companies must account to the commission, when required, for the disposition and application of the proceeds of all sales or pledges of stock, bonds, or other evidences of indebtedness, and apply such proceeds in accordance with reasonable rules and regulations which the commission may impose.

The powers and limitations of companies as described by the law, make it lawful to classify services and rates according to the nature, quantity and time of service, as well as the bulk, value and facility in handling commodities. It is lawful to establish approved "sliding scales" automatically raising dividends (above the basic reasonable return) as rates are reduced, in order that the company may participate in economies, efficiencies and improvements in methods of service yielding additional profits. Advance payments, minimum payments, deposits for security, discounts for prompt payment, and penalties for failure to pay promptly are permitted if applied without discrimination.

Public service companies can be incorporated only after securing a certificate of public convenience; only likewise may existing public service companies renew or supplement their charters or obtain additional rights, powers and privileges. The sale, assignments and transfer of property, powers, franchises, etc., can be made only by permission.

A municipal corporation may acquire, construct or operate any public service plant or facility only on approval of the commission. But any municipal corporation, now operating, may continue or may extend its operations within its territory without such consent, and any works under construction may be completed and put into operation without approval.

It is made lawful for public service companies to issue stocks, bonds and other evidences of indebtedness only for money, labor, or property; and the commission's certificate of valuation may be secured to show that this section has been complied with. In instances where a certificate of valuation is not sought, a company increasing its obligations is required to file with the commission a certificate of notification showing the total amount of securities to be issued, the amount of outstanding prior issues, the amount theretofore required, disposed of, or held in the treasury (as a free asset or pledge), the amount of the new issue and its purpose, with full details of sale, pledge, par value, preferences and privileges, rate of interest, time of maturity, redemption value, etc. But the requirements of the act in regard to certificates of valuation or notification do not apply to issues payable within 12 months.

A railroad or street railway may cross a public highway, or the tracks of another company, at, above, or below grade, as directed by the commission. The facilities of one utility may cross similarly a highway or other utility works.

It is made unlawful to capitalize franchises and privileges in excess of their cost, or leases and contracts for sale or consolidation; issues of securities are illegal in substitutions exceeding the aggregate value of properties consolidated, plus any additional value actually contributed as determined by the commission. It is made unlawful to acquire, or hold a controlling interest in any public service company doing business within the State without the consent and approval of the commission, but a minor interest may be held by one company in another subject to existing laws, without the approval of the commission. This requirement does not affect the control of corporations heretofore legally held, or diminish the previously acquired rights of any company in another; it does not prevent the future acquisition of stocks, bonds and other evidences of indebtedness where the major interest was acquired prior to the date when this act became effective.

Contracts or agreements between a public service company and a municipal corporation are not valid unless approved by the commission; on notice to the local authorities, a public service company may apply to the commission before securing consent of the local authorities for a declaration of the terms and conditions on which it will grant approval.

The law establishes "The Public Service Commission of the Commonwealth of Pennsylvania," consisting of seven members appointed by the governor with the consent of the senate, those at first ap-

pointed, are to hold office for 4, 5, 6, 7, 8, 9 and 10 years respectively, from July 1, 1913, and until their respective successors have been duly appointed and qualified, these successors being appointed for terms of 10 years each. A quorum is secured with 4 members who must act unanimously for all purposes. Any investigation, inquiry or hearing within the power of the commission may be undertaken before or by any one of the commissioners when properly authorized to act for the whole body, but any determinations, rulings or orders of such a commissioner are not to become effective until approved by a quorum. The commission appoints its secretary, a marshal, an investigator of accidents, and such officers, experts, engineers, statisticians, accountants, inspectors, clerks and other employees as it may deem necessary. The general counsel of the commission is "ex officio" the State attorney-general, and he is directed to appoint two attorneys as counsel and assistant counsel for the commission.

The salaries of the commissioners are fixed at $10,000 each, except the chairman, who is to receive $10,500. The secretary is to receive $5,000, the counsel $7,500, the assistant counsel $5,000, the investigator of accidents $5,000, and the marshall $2,000. The salaries of all other agents and employees to be fixed by the commission.

The powers and duties of the commission are defined in detail. It is given power to act on complaint or on its own motion. It may ascertain the fair value of the property of every public service company in commonwealth, exercising this power whenever required for any of the provisions of the act. It is permitted, in determining fair value, to consider every pertinent fact, including original cost—particularly with reference to amounts expended in existing improvements, market value of bonds and stocks, probable earning capacity of the property under any particular rates and with expenditures for obsolete equipment and construction as warranted by circumstances or the development of the enterprise, reproduction cost of property, development and going-concern value. All of these to be given such weight as is just and right.

The commission has power to subpœna witnesses, to compel testimony and the production of records. It may withhold from the public any facts or information obtained during any investigations if such action is in the interest of the public. All hearings are to be public. No individual can be excused from testifying or producing records on grounds of incrimination, but immunity from prosecution is extended.

Petitions for rehearing may be made within 15 days after the service of an order and the commission may grant one if it judges good cause shown; but an application for rehearing is not to operate as a supersedeas or to stay or postpone the enforcement of an original order, except as the commission may direct. Any party to a proceeding may appeal from the finding of the commission within 30 days to the Court of Common Pleas of Dauphin County, which court is clothed with exclusive jurisdiction for hearing such appeals. The court by an interlocutory order may make such appeal act as a supersedeas after notice to the commission, and hearing. The orders of the commission are to be taken as *prima facie* evidence of the reasonableness thereof, and the burden of proving the contrary is upon the appellant. No new evidence can be received at an appeal hearing, but if the court is satisfied that new evidence has been discovered, it may remand the case to the commission to take such new evidence, and act in accordance.

If the court finds an order unreasonable, based on incompetent evidence, or not in conformity with law, it may reverse the order of the commission or may remand it with instructions to reconsider.

Depreciation: Estimated and Actual.[1]

By Alex. C. Humphreys, M.E., Sc.D., LL.D.

The American Gas Institute, having accepted the gracious invitation of the Institute of Gas Engineers to present a paper at this meeting, which is intended particularly to celebrate its fiftieth anniversary, I have been designated to represent the sister Society for this service. I appreciate the honor thus conferred; and this sense of appreciation finds emphasis in the fact that my long-time friend, Sir Corbet Woodall, is the Institution's President this Jubilee year.

I have chosen as my subject "Depreciation," so-called; a subject of importance to the owners and managers of all industrial properties. It is of particular importance to the owners and managers of public service properties. In connection with rate-making cases before commissions and courts, it is of vital importance to day to the owners and managers of public service properties in the United States. Within the limits of a single paper—perhaps extended beyond the bounds suggested by a kindly forbearance—I cannot hope to meet satisfactorily all the many and complex questions which have come to be included or involved in the ambiguous term "Depreciation." Certainly, as used in the United States, the term is not self-explanatory. This inability on the part of those discussing moot questions to agree upon the meaning of terms and forms of expression is at all times a fruitful source of otherwise unnecessary disagreement. Perhaps this is particularly in evidence in the United States. I know in advance, therefore, that, through one cause or another, partly on account of the magnitude of the subject and my inability to give adequate expression to my views within the limits required, I shall not now succeed in avoiding all misunderstanding.

Necessarily, what I have to say is of more direct interest to an American audience; but part of what follows should be of interest to all owners and managers of public service properties. And, in view of the fact that there is no inconsiderable amount of British capital invested in American public service properties, this discussion may be found of direct interest to many on your side of the Atlantic. In view of the spirit of unrest which is now in evidence all over the civilized world, and the readiness with which additional laws are placed upon the statute books of the United States, it is of the utmost importance that those who are responsible for these properties should be more nearly in agreement as to the most effective lines to be followed in their honest efforts to secure full protection for the investments entrusted to them.

If the many and complex questions involved in depreciation are to be solved, so as to do justice both to the investor and the purchaser of service, there is required on the part of all concerned the most competent, comprehensive and judicial study and treatment. While this responsibility must rest upon all who can (or do) exercise influence in the settlement of these questions, particularly must the responsibility rest upon the lawyers and experts representing the companies. In certain cases these representatives of legitimately invested capital have not sufficiently mastered the questions involved to qualify them to meet effectively their great responsibilities. This is peculiarly a cause for concern, because the commissions and courts have of late years had thrust upon them for adjudication many novel questions; and so they need at our hands all that we can furnish as to general theory and special conditions. Here it is necessary to distinguish between hypothesis and theory. The throries adopted must include all the accepted teachings of experience.

While looking and hoping for, and confidently expecting, such a revision of public opinion as will give the public service corporations more even-handed justice than has been indicated of late in certain cases, this hope and expectation should rest upon the determination on the part of those most directly concerned to do all that is legitimate and straightforward to this end. Certainly it is the duty as well as the best policy of the representatives of the companies to be frank in their statements of fact and bold in the presentation of their opinions, provided those opinions have been formed with the rights of all in mind.

We must believe that, in the great majority of cases, the commissions and courts are doing their best, as far as time and training permit, to arrive at judicious decisions; but, without wishing to express disrespect for our commissions and courts, certainly we must not be too ready to accept their opinions as the final word on any technical question. Some of our lawyers and experts are too ready to accept court opinions and decisions as final. The fact that on any of the questions we have to consider we can find court opinions varying through a wide range should furnish a sufficient corrective to this subserviency of mind. Certainly we should constantly keep in mind that, at least on many of the technical questions involved, engineers are more competent to form a correct judgment than are the lawyers or judges.

For instance, I am not prepared to change my opinion as to the strength of cast iron pipe, as ordinarily used for the distribution of gas, because the late Justice Peckham, of the Supreme Court of the United States, in handing down the unanimous decision of that Court, in the celebrated New York Consolidated Gas Company's case, included in his opinion the statement that one feature of the law under consideration could not be enforced against the Company because a pressure measured by a column of water 2½ inches high would burst the cast iron pipes used to convey the gas.

This may be taken as an exceptional error. But this case of the

(*Continued on page* 170.)

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THOMAS J. CUNNINGHAM, SANFORD K. CAMPBELL, } Editors.

NEW YORK, MONDAY, SEPTEMBER 15, 1913.

[Official Notice.]

Annual Meeting, Michigan Gas Association.

Michigan Gas Association,
Office of Secretary,
Grand Rapids, August 12, 1913.

To the Members, Michigan Gas Association: Did you ever hear Mr. Herbert N. Casson talk to the gas men? Did you ever hear him talk to anyone? Well; there is a great treat in store for you at the next meeting of our Association, for he will then talk to us on the subject of "How to Get Gas Across." Mr. Casson is great. He makes you laugh, cry, "sit up and take notice," and applaud his forcible, entertaining arguments, with his original ideas of modern business building. Then, too, we will have some mighty good papers, as witness:

"Practical Effects of the Workmen's Compensation Law," by Mr. Albert G. Schroeder.
"Gas Advertising," by Mr. Alonzo P. Ewing.
"The Increased Cost of Gas Making Materials," by Mr. B. O. Tippy.
"Educating the Public," by Mr. Ernest F. Lloyd.

Among other things our entertainment programme will include an afternoon boat trip and supper at Bois Blanc. On the boat we will have another good talk by a very prominent newspaper man, who will tell us some things that we all ought to know. A meeting in Detroit always brings out a big crowd, and this promises to be one of the big meetings.

The city, Detroit; the place, Hotel Pontchartrain; the time, September 17, 18 and 19th. Make your hotel reservations now.

Yours very truly, Glenn R. Chamberlain, Secy. and Treas.

[Official Notice.]

Twenty-First Annual Meeting, Pacific Coast Gas Association.

Pacific Coast Gas Association,
Office of the Secretary,
San Francisco, Cal., Sept. 4, 1913.

The 21st Annual Convention of the Pacific Coast Gas Association will be in session at the "Garden City," San Jose, Cal., September 16th, 17th and 18th, 1913, and will be presided over by Mr. C. S. Vance, of Los Angeles, Cal., and at which meeting the following papers will be presented:

President's Address, by C. S. Vance.
"Oil Gas," by Leon B. Jones.
"Industrial Uses of Gas," by John B. Redd.
"Rate Making," by Dr. A. C. Humphreys.
"Modern Gas Distribution and Part Played by Automobiles," by D. E. Kepplemann.
"Gas Street Lamps," by C. S. Babcock.
"Gas Company's Public Policy," by L. A. Wright.
"Standards of Quality and Service for Oil Gas," by H. M. Papst.
"Wrinkles," H. W. Burkhart, Editor.
"Experiences," John Clements, Editor.
"Novelties," H. P. Pitts, Editor.

Everything points toward a goodly attendance upon the convention. The annual banquet will be held at the Hotel Vendome, Wednesday evening, September 17th. On Thursday, the members and their families in attendance upon the convention will, as guests of the San Jose District of the Pacific Gas and Electric Company, be entertained with a trolley trip through the beautiful Santa Clara Valley to the famous Alum Rock Park, where luncheon will be served. After which dancing and other amusements can be indulged in by the members and their families. Henry Bostwick, Secy.

[Official Notice.]

Illinois Gas Association.

Illinois Gas Association,
Office of Secretary,
Oak Park, Ills., Sept. 6, 1913.

To the Members, Illinois Gas Association: In accordance with a resolution, passed at the last annual meeting, the Board of Directors have selected Mr. E. G. Pratt to represent the Association on the Joint-Committee on International Gas Congress. The 1913 "Proceedings" were sent out September 2d, by prepaid express, to all members in good standing. As dues accounts are payable by August 1st of each year, members who have not paid the current year's dues are delinquent. Mr. Walton Forstall, of the Sub-Committee, Distribution Programme, American Gas Institute, wishes to call attention to the coming Institute meeting at Richmond, Va., October 15-17, 1913. Every gas company should send at least one representative to this meeting.

Mr. J. E. J. Mayer, Chairman Entertainment Committee, Illinois Gas Association, advises that La Salle Hotel, Chicago, has been selected as the place of next meeting, Illinois Gas Association. The date is March 18th and 19th, 1914.

Members who have not sent in their suggestion cards to the Technical Committee should do so at once, so that the subjects for papers can be tabulated and a desirable programme selected.

Yours respectfully, Horace H. Clark, Secy.

BRIEFLY TOLD.

"On to Richmond!"—The slogan seems sounding strong; and if the declarations heard on every side, affirming the intention and purpose of the declarers to be present at the meeting in Richmond next month are personally redeemed, it behooves one and all to make certain now that their hotel reservations are forwarded forthwith. A prime feature of the technical sessions, regarding which little has so far been said, will be the lecture on "Surface Combustion," to be delivered by Prof. Chas. E. Lucke, of Columbia University, who is a pioneer in this particular field, which is beyond a doubt of absorbing interest to the fraternity of gas engineers—meaning the men who direct the operation of gas manufacture and gas distribution. The lecture will certainly have this unique feature, in that surface combustion will be shown successfully applied to domestic heating and cooking. Gas stoves will be shown in active service, operating under this system, and actually demonstrated as a commercial success. Unlike most lectures, this lecture will be printed in advance in full (September Supplement, "Gas Institute News,") and Prof. Lucke invites and desires full and free discussion. The appliances, which will be connected and in operation, will clearly demonstrate the applied usefulness and economy of the system, and so will be of exceeding interest to all present. In fact, this system will open up a field of unlimited usefulness and expand value to the entire gas industry. The appliances used will show in concrete form the applied results of years of study, prolonged research and vast numbers of experiments. The Institute could hardly bring prominently forward a subject of greater importance, and it is to be warmly congratulated in having been able to interest the services of so able a physicist to present the subject. The Lucke lecture, alone and of itself, will amply repay anyone concerned in the progress of the gas industry for the time and cost incurred in attending the Richmond meeting of the Institute.

The Gas Meeters Resuming Activity.—The New York Section, Gas Meeters, will hold the first fall meeting on the 18th inst. It is planned to meet at the Demonstration Building, Brooklyn Union Gas Company, on Livingston street, Brooklyn, and from there adjourn, travelling by special cars, to the Hotel Osborne, at Sheepshead Bay, for a shore dinner and cabaret show. Be on hand and register in order that you may be sure of getting notice of all future meetings.

Fifth Annual Meeting of the Society of Gas Engineering, New York City.—Last Thursday afternoon the Society of Gas Engineering, New York city, held its fifth annual meeting and outing, the fields in-and-about the great plant of the Astoria (L. I.) Light, Heat and Power Company being the scene of activities. The members and guests (the latter included a goodly representation of the Society of Gas Lighting) were conveyed to Astoria in special auto-coaches, and arrived at the gathering point shortly after 3 o'clock. All who checked their hats received in temporary exchange a "paper lid" which added ("added" is used advisedly) color, if not dignity, to the scene. The baseball game certainly was a well-attended feature, and the "nines" lacked nothing in numbers, there being at least two men for each position, two men to "help along" the runners; and two of the horsehide covered spheres were usually in play. The least said

about the scoring the better. The wheelbarrow contest, the tryout being along the lines of direction, the contestants, of course, being blindfolded, developed a variety and strangeness of effort. The Engineer-of-Manufacture, Mr. Woods, was awarded first prize, having managed to "tote" himself within 3 feet of 100 per cent. His reward was a nicely-wrapped hot plate, securely mounted on a cast iron base. Mr. Barlow, who landed successfully in second place, received an illustrated copy of "Gas News." "Phil." Cross also did excellently well; but, unfortunately, his heading was in the direction of the retort house, hence his friends had to set him right. Then all the celebrities tried out their strength with the sledge. The athletic Mr. Gawtry did his best, as also did Messrs. Addicks, McLean, Morris, Simpson, Hoyt, Ramsdell and Dr. Humphreys (the latter declared that if Mr. Walton Clark were there he would easily win), and "many others." In the end, however, Chief Bradley proved the only contestant who had the right swing. So well directed were the veteran's blows that the bell rang at the end of each of his 3 hits. The other prize winner (Mr. Woods) and the Chief were then driven to their reward—that is, they were trundled around in an auto drawn by the rest of the contestants, preceded by "Our Own Band," Mr. Kellogg acting as drum major, whose remarkably well balanced form, as to heighth and width, was the subject of frequent comment. Just before the parade was started a group picture was taken of those in line for the triumphal procession. At the dining tables "on the green," the host marshalled itself, hastily but with decorum, to partake of a bountiful beefsteak dinner, washed in and down with the brew of the breweries. Each diner got two souvenirs. One was a photograph of the big holder, flanked by the two huge purifying houses and backed by the meter house, the holder bearing a splendidly executed photographic reproduction of the Chief. The other souvenir was a silver pocket knife, marked "Hail to the Chief!" The cutlery was also marked with the date of the celebration. Meanwhile the band rendered operatic selections, four colored songsters emitting several selections, more or less tuneful; but all decidedly fervid. Mr. Kelly then introduced "A gentleman who needed no introduction." President Cortelyou was the person, and he delivered an address thoroughly characteristic of him. Which means that its sentences were pointed, pithy and pleasing. He congratulated the Society over its singleness of purpose, and recounted briefly the great and continued work of the Chief, whose attainments actually increased as time lengthened his splendidly useful career. Mr. Cortelyou further remarked that, on account of many single things that Mr. Bradley had accomplished he would have been knighted on the other side of the ocean; but his friends knew that the Chief valued, more than any knighthood, the esteem and love with which he is regarded by his associates. In responding, the Chief acknowledged the fealty and loyalty of his associates, closing with a word of advice to the youngsters, and with hearty thanks to his confreres. Truth to say, however, he did not seem to know what to do with a huge birthday cake, its top ablaze with candles, that was carried to him by a "dark man" when the speech was at an end. Secretary Fogg being abroad, he was not on hand to direct things; but let me say that "everybody there saw Kelly," and Kelly saw to it that everything went on as it should have gone.—Camp.

Summary of the Existing Public Service Commissions.—The following lists show the States in which the public utilities are more or less supervised or controlled by commissions:

States Having Commissions with General Control of Utilities.

Arizona.	Michigan.	Ohio.
California.	Missouri.	Oregon.
Colorado.	Montana.	Pennsylvania.
Connecticut.	Nebraska.	Rhode Island.
District of Columbia.	New Jersey.	South Carolina.
Georgia.	Nevada.	Vermont.
Idaho.	New Hampshire.	Virginia.
Indiana.	New York.	Washington.
Kansas.	New Mexico.	West Virginia.
Maryland.	North Carolina.	Wisconsin.
Massachusetts.	Oklahoma.	

Legislative measures for the forming of Commissions are under consideration in

Delaware. Illinois. Minnesota. Maine. Tennessee.

Measures for the instituting of Commissions were recently rejected by the lawmaking assemblages of

Iowa. Kentucky. South Dakota. Utah.

There are no gas and electrical Commissions in these States:

Alabama.	Kentucky.	South Dakota.
Arkansas.	Louisiana.	Texas.
Florida.	Mississippi.	Utah.
Iowa.	North Dakota.	Wyoming.

All these latter (save Utah and Wyoming) have Railroad Commissions. Further, most of them have supervision or jurisdiction over telephone, telegraph and street railway corporations. Governor Tener, of Pennsylvania, recently named the following to serve on the State Public Utilities Commission, created at the last session of the Pennsylvania Legislature: Chairman (10 year term), Nathaniel Ewing; 9-year, S. L. Tone; 8-year, S. W. Pennypacker; 7-year, E. R. Johnson; 6-year, M. J. Bucht; 5-year, C. F. Wright; 4-year, F. M. Wallace. And Governor Cox, of Ohio, has appointed O. H. Hughes (Hillsboro), Wm. L. Dechant (Middletown), and E. W. Doty (Cleveland), to serve as members of the Ohio State Public Utilities Commission, which succeeds the former Public Service Commission, as of the mandate of the last session, Ohio legislature.

CURRENT MENTION.—

"M., writing from Chicago, under date of the 9th inst., says: "I had occasion recently to visit South Haven, Mich., and while there I, of course, had occasion to look up the local gas men. I met Mr. C. A. Runyan, the active head of several small gas plants in Michigan. Although a young man, not quite 30 years of age, in association with L. F. Ryall, he has financed and built gas plants at South Haven, Sturgis and Otsego, Mich. The latter plant supplies gas under a high pressure system of about 5 pounds to Otsego, Allegan and Plainville. To all appearances the business in the named places is being handled on modern, aggressive lines, up-to-date in all respects. In fact, the trading is in the hands of young men, all of whom are interested in the work and prompt in applying methods promising betterment of service and greater economies."

Mr. Nelson G. Phelps, the go-ahead engineer in charge of the industrial division of the Citizens Gas and Electric Company, of Waterloo, Ia., reports that the following industrial establishments have installed gas in their respective factories: Waterloo Gas Engine Co., Iowa Dairy Separator Co., William Galloway Co., Swift Manufacturing Co., Waterloo Boiler Works, National Engine Co., Dart Mfg. Co., Waterloo Brass Foundry Co., Waterloo Canning Corporation, Waterloo Register Works, and the Chamberlain Machine Works.

The New Jersey State Board of Public Utilities is taking testimony respecting the propriety of directing the Public Service Gas Company to extend its mains to Dumont, a section quite remote from any existing pipe system. There are a number of like requests pending from other similarly situated or comparatively isolated places, and the Board has announced that it will give special consideration to the points involved in the effort to eventuate a rule that will be general in its application in the premises.

Under date of the 4th inst., Mr. J. P. Eastman, of the Manitowoc (Wis.) Gas Company, received the following letter from Mr. J. W. Barnes, of the Richards Iron Works, Manitowoc—it is self-explanatory: In reply to your communication of recent date, in reference to the success we had with the coke purchased from the Manitowoc Gas Company, will say this much. We were very pleasantly surprised with the results. We have been using it for some three weeks and started with using very little of it, as we were afraid it might spoil our heats. However, we increased the quantity each day until we were using about 30 per cent. in our bed and 50 per cent. in the rest of our charges. We were using our Connellsville coke with it. We tested several castings from each heat in order to find out what effect your coke might have on our castings, and are pleased to advise that we could see no perceptible difference in our castings from times we were using Connellsville coke entirely. We wish to say, however, that our heats have been running from 2,500 to 3,500 pounds per day, being very light. We do not know what effect heats of 5,000 to 6,000 pounds would have on this coke, but think it would hardly be safe to use as large an amount of your gas house coke on the bed as 30 per cent.; but we believe it would be safe to use 50 per cent. in the rest of the charges. We wish to thank you for having kept after us on your coke, as we will admit we were very much afraid to try it. We are now glad we did, as there is a considerable saving in it for us, with quite a lot of convenience. We have talked the matter over with Mr. Douglas in regard to contract, and believe we will sign up for 50 or 60 tons of your coke for the next year.

Book Reviews.

"*Laclede-Christy Firebrick: Uses and Practices for Which Adapted.*"—This is the title of a "booklet" recently issued by the Laclede-Christy Clay Products Company, of St. Louis, Mo., and while perforce it has mainly to do with that Company's high-class goods, the advertising thereof in this booklet is not in any sense of the bombastic sort. It is of very convenient dimension, is printed on good paper, from clear type. In fact, the make-up from a printer's point of view is neat and serviceable. Amongst the data that it carries are reprints of Table No. II., "Technologic Papers, Bureau of Standards," detailing the U. S. Bureau of Standards determinations respecting the melting points of various bricks; also, Table No. V., Technologic Division, Department of Commerce and Labor, which furnishes the figures given by Director Stratton, of the named Division, respecting "The Testing of Clay Refractories, with Special Reference to Their Load Carrying Capacity at Furnace Temperature." Also, Table No. VII., of the like series. We do not know who it was of the Laclede's staff that got up the booklet, but both are to be congratulated over the outcome of the compiler's efforts. Vice-President R. D. Hatton is our authority for the statement that the Company will mail copy to anyone who forwards a request for it.

"*A Letter to Users of* 4,000 *Brown Electric Pyrometers and* 100 *Replies.*"—This is the titling of a handsome 16 page folder circular just issued by the Brown Instrument Company, of Philadelphia. If further proof were needed as to the usefulness and longevity of the Company's pyrometers, the leaves of the folder amply carry such proof, in that signed acknowledgments from 100 users of the goods are reprinted. This sort of advertising is usually accepted as proof positive.

(*Continued from page* 167.)

Consolidated Gas Company was one of vital importance to our public service corporations, and we may assume that it received the most careful attention of the judge to whom was assigned the duty of making the more specific study of the evidence and of writing the opinion of the Court. Judge Peckham was an able judge and a fair man, yet he made an error which an illiterate but specifically trained foreman of a street gang could not have made. If Judge Peckham could make such an error, why should we blindly accept the opinions of commissioners and judges simply by reason of their official position?

Are we not further warned against a too subservient attitude of mind in this connection when we find our commissions and courts holding widely different opinions on what appears to be comparatively simple points of law? Where there is a direct question stated, with all the facts arrayed on both sides, I see no reason why the engineer is not as competent to express a sane opinion on the law as a judge or lawyer is competent to express a correct judgment on some technical question in engineering or accounting. I feel quite sure that in many cases I could do as well on the law questions as Judge Peckham did on the question of the strength of the ordinary cast iron pipe.

I could cite many other cases to support this proposition. I have in mind a statement, presented over the signature of the chief statistician of one of our most influential State public service commissions, in which nearly a million dollars was deducted from the operating expenses of a certain company because the money was paid for taxes Those of us who have to supply from income the money to meet the tax collector's claim will find little comfort in the statement of commission or court that this item of cost is a "fixed charge," and, therefore, something different from the other items of cost—such as wages, salaries, coal, etc. I do not find that this classification assists me to pay the bill or to reduce the cost per 1,000 cubic feet of the gas sold.

Much of the error to be found in the opinions and decisions of the commissions and courts is due to the acceptance of hypotheses as theories, which fail to meet the definition of theory because they exclude the necessary limitations of practice. One reason for misunderstanding in connection with depreciation, so-called, is that some of those charged with responsibility fail to appreciate, either wholly or in part, that the questions involved are not the same in the case of a so-called monopoly, subject to governmental regulation, as in the case of a commercial undertaking engaged in an avowedly competitive business, and which only has to reckon in this connection with its owners. This statement is not to be misinterpreted by those who, through ignorance, are ready to discover dishonest motives actuating those dealing with the public.

To take a simple example: In a close corporation engaged in a competitive business, the managers of which are liable only to their own stockholders, it may be considered right and wise to distribute only a portion of the net profits and to apply, wholly or in part, the surplus profits, particularly in extra prosperous years, to writing down the plant account. In the past this has been regarded as conservative practice. Even though the proprietors received no additional stock to represent the increase in assets, they knew that their proportional shares in the ownership of the property remained unchanged; but, to get a fair return on the full investment, the dividends were necessarily based upon what appeared to those uninformed as an excessive dividend rate. The fact that the plant and business had been extended by the investment of earnings—the dividends paid as averages through the years probably having been moderate—does not in any way vitiate the ownership of the stockholders in these extensions. If all the net profits had been distributed to the stockholders, and then the additional capital as required had been handed back to the company in payment for additional stock, the facts would not be changed. Yet, by this last method, there could have been no question as to the rights of the stockholders.

In the case of public service corporations, whose rates of charge are subject to regulation, however, this practice raises questions, and so subjects the stockholders to unnecessary hazard. In the State of Massachusetts this practice of writing down plant account—charging extensions against income and also debiting lump sums to loss-and-gain and crediting plant account—has been much in evidence. This was to be expected from the generally conservative tendencies in New England. The State of Massachusetts was the first to place its gas companies under the supervision or control of a Commission. This Commission was not given the powers that are now conferred upon our State Commissions; but it exercised a very restrictive influence as to stock and bond issues and rates of return, and its decisions in this connection have not been notable for consistency. The case is made harder for the stockholders because the law of this State prohibits stock dividends to cover surplus earned.

The effect of this writing down of the Massachusetts companies is at once apparent by a study of the annual reports of the Commissioners of Gas and Electricity. These companies, instead of showing "watered" stock, show a total capitalization which does not represent the structural value of the plants, to say nothing of certain overhead charges and "going value." One of these companies shows a capital which is equal only to 35 cents per 1,000 cubic feet of annual sales. If we add to the capital stock as issued the "notes payable," issued to cover *part* of the extensions, and for which the company may hope to be allowed to issue stock, the total is only $1.64 per 1,000 cubic feet of annual sales. The cost to reproduce the plant and business of this company would exceed $5 per 1,000 cubic feet of annual sales.

In a case recently decided by this Commission, the Attleboro Gas Company had been paying 12 per cent. dividends on a capital which was equal to $1.10 per 1,000 cubic feet of annual sales. The Commission in its opinion says: "Its capital, in proportion to its business, ranks lowest of the gas companies in the State." This Company had no "notes payable" against extensions; so presumably the Commission took this into account in making the comparison with ether companies, and particularly the Company to which I first referred. But notwithstanding the Company was paying only 12 per cent. on its capital as issued, which would have been about 2.6 per cent. on a capital equal to $5 per 1,000 cubic feet of annual sales, the Commission reduced the price of gas, at the same time enunciating certain rules which clearly must operate to confiscate portions of the Company's legitimate investment.

I simply introduce these cases to point out that, what may be conservative policy in the matter of writing down plant account to cover "depreciation," in the case of a company managing its own business, it is a fatal error to write down assets below their legitimate investment cost where we are subject to the opinions and control of those who have had insufficient practical experience. It may be easy to understand that the public, in the persons of the consumers, are willing to take something for nothing, but this does not prove that the investor can rightfully be required to accede to such a demand; and if he is so treated he will in future be slow to furnish capital for new public service undertakings or for the further development of those already in operation. Not only does this unscientific and haphazard method of "writing down" of assets work a direct injury to the stockholders of the company involved, but it works an indirect, but very potent, injury to the industry as a whole, by furnishing opportunities to the adroit and unscrupulous statisticians to make comparisons which appear convincing on their face, but which have no value when analyzed. Unfortunately, many such comparisons are accepted on their face in the absence of competent analysis. Here we must not forget that the public and the irresponsible politicians are on the watch for high rates of dividends, without regard to the relation between total legitimate investment and total face value of bonds and stock.

It may create some surprise if I make the statement, as I do, that not a few of our well established steam railroads have so maintained and so extended and bettered their plants from income that they could not now pay 5 per cent. annually on the reproduction cost of their physical assets alone. I believe this would be true of our railroads taken as a whole. Or we can say that the total par value of the stocks and bonds of all our railroads does not equal the cost to reproduce their physical assets. It is not unlikely that this statement will be received, even in certain quarters in the United States, with doubt and perhaps derision; but I venture to state that some of our public service commissioners, those competent, fair and courageous, who might have laughed at this statement a few years ago, would now, as the result of their experiences, be willing to lend it their support.

In our gas and electric rate fixing cases—in the first instance generally tried before the State public service commissions—we are called upon to meet commission and court decisions which are far from being consistent. In general, the service rate of charge must be one which allows of a "fair return" (whatever that may mean) upon the "value" (whatever that may mean) of the property "usefully employed." Perhaps the one element which is included in all decisions is the appraised value of the plant. Some courts have defined this as the cost to reproduce new, less "depreciation." This is the

dictum which the public service corporations are most generally called upon to face.

Many questions are here introducod as to what constitutes the reproduction cost. Shall the unit prices be those quoted at the time of making the appraisal? As this might work for or against the corporation under fire, it is sometimes suggested that the average prices for the last 5 or more years should be used. Here there is a fine field for argument, and especially on the part of the experts, lawyers, and others opposed to the public service corporations. A prolific source of debate is the question of pavements over mains. If the mains were laid before the pavements, should the company claim the cost of pavements as adding to the cost to reproduce new? If the company were selling its property, whether the pavements were laid before or after the pipes, the price would be enhanced by reason of the mains being under pavement.

Some commissions and courts include tho value for sale of the property as a whole as an element for consideration. Others, like the California Commission, exclude this element from consideration in a rate fixing case. To be on the safe side the companies must be prepared to meet any and every contention which has received any measure of approval at the hands of any commission or court, no matter how inconsistent these several contentions may be when introduced in the same case. The company may have to face a selection of all the elements least favorable to its case, irrespective of consistency. The opinion of the Massachusetts Commission in the Attleboro case, recently decided and previously referred to, is notable for its inconsistencies.

There are other items to be considered in the making of an appraisal which are prolific sources of disagreement, either as to their admission or as to their measure, such as preliminary expenses, interest and taxes during construction, omissions and contingencies, engineering, organization during construction, insurance, compensation of general contractor (including his expenses), "going value," etc. Fortunately there is a fairer disposition now in evidence as to the admission of these "overhead charges," though there is still ample room for improvement in the interest of justice to the investor. The Public Service Commission of the Second District of New York has done more than its share in developing sane and fair methods in these and other connections. The Wisconsin Commission also has shown a disposition to be fair and independent in its statements of principles, though it has not always been keen to be guided by the principles so enunciated.

It is not my present purpose to discuss at length these and other items which we have to consider in our rate fixing cases. I may say, however, that these items, of which depreciation is one of the most, if not the most important, all things considered, are to-day questions of vital moment to many of our Public Service Companies. I have referred to these matters in the effort to disclose the atmosphere in which we have to fight for justice.

The subject of "depreciation," as connected with the making of appraisals for rate fixing cases, has been greatly complicated by being involved with the estimates made to cover each year's share of the cost of final renewal or replacement of plant; this to be included as one of the year's items of cost of operation. This estimate is made, and the annual debit to loss and gain and credit to a reserve account are made, solely for the purpose of spreading more evenly over the years of the plant's service the cost of that portion of maintenance which is not covered by current expenditures for repairs and minor renewals. This estimate of final renewals is supposed to include the elements of physical decay, obsolescence and inadequacy.

Unfortunately, as I thing, we have not infrequently included in this estimate some reserve for extraordinary hazards outside of final renewals. This introduces an unnecessary complication, particularly when it is claimed that the plant has depreciated to an amount represented by the balance to the credit of this depreciation reserve. By segregating the charge for final renewals from contingencies and hazards, we would be in a position to support more effectively our three claims—namely, the inclusion of an annual cost charge to cover final renewals; the inclusion of a reasonable charge for the creation of a limited reserve for contingencies and hazards; and the exclusion of a depreciation deduction from our plant appraisals in rate fixing cases.

We will assume that the estimate of the annual cost of final renewals of the several parts of plant is made on the basis of a compound interest sinking fund. The total amount required each year to be charged to loss-and gain and credited to reserve will be made up of several amounts required to replace the several parts of plant at the end of the several expectations-of-life which we, in our wisdom or unwisdom, assign to each part of the plant. These parts will be grouped together according to the assigned expectation-of-life. The amount annually required for each group will be the sum which, accumulating at compound interest for the year assigned, will equal the cost of the plant—or the cost less such amount as we believe we can recover in disposing of the displaced parts of plant.

It is thus seen that the total amount credited to reserve each year is the sum of the amount required for the several sinking funds; the number of such sinking funds being the number of different lengths of life we have assigned to the several parts of plant. This bringing together of the amounts required by these several sinking funds is convenient in our accounting; but it has led to further complication by bringing into the problem the so-called "average life" of the plant. The use of this term in constantly creating the impression that the plant lives to the term set by the average life and then has to be renewed as a whole. Nothing could be farther from the truth.

To show that, in a sinking fund scheme, there is no length of time which is mathematically the average life, it can be pointed out that this term will vary in length with the rate of interest by which the fund compounds. For instance, I have before me a very simple expectation-of-life table in which there are assumed only five groups of parts of plant as follows: Group "A," 10 years, $25,000; Group "B," 15 years, $50,000; Group "C," 25 years, $100,000; Group "D," 35 years, $150,000; and Group "E," 50 years, $175,000; total, $500,000. The true average life found by dividing in each case the cost by the expectation-of-life is 28.378 years; whereas the so called "average life" for a 2 per cent. sinking fund would be 28.2 years; for a 4 per cent. sinking fund, 27.73 years; and for a 6 per cent. sinking fund, 27.05 years.

To emphasize the point that this average life should not be allowed to misguide us, and further that the sinking fund is in fact a collection of sinking funds, it may well be noted that in the life-table above given the several groups of plant will be renewed within the 50 years which completes the cycle, as follows: Group "A," 5 times; Group "B," 3½ times; Group "C," 2 times; Group "D," 1½ times; and Group "E," 1 time. Here it can be seen that, while the term average life may be convenient for use by those who understand the subject, it may readily lead into error those who have that little knowledge which is so dangerous. This brings me to three points which must be kept constantly in mind in connection with the study of the problems in depreciation:

1. The depreciation reserve, or, more correctly, reserve for final renewals, is set up for the purpose of spreading the cost of final renewals of parts of plant as uniformly as possible over the periods during which the several parts are expected to render effective service; thus obviating unnecessary fluctuations in cost of operating, and so making it more practicable to keep the rates of dividends as uniform as possible.

2. The amount to be so charged annually to loss and gain and credited to reserve is based upon an estimate or assumption of the effective life of each part of the plant, considering the elements of physical decay, obsolescence, and inadequacy. There is here the opportunity for the exercise of the highest judgment, recognizing the difference between hypothesis and theory and keeping in mind all the limitations of practice. To cover the element of obsolescence, we must know the present state of the art, and prophesy as to the future. As to inadequacy, we must estimate as to the future increases in demand for service. As to physical decay, we are limited as to the future by the character of the management, over which we may have no control. Necessarily, then, this estimate is subject to correction. It must be based upon certain assumptions; and these assumptions as to design, construction, operation, and accounting, must control so long as the estimate goes uncorrected. This should mean that the estimate must constantly be open to correction as additional general and specific experience is gained. It should also follow that no tables of averages are applicable to any specific case.

3. The loss will not have to be met until the replacement actually is made. It is an accruing liability against an obligation not yet due. Hence, if we take out the year's share of the accruing liability, as the payment is not yet due, the fund should receive the benefit of interest accumulations until the time for payment arrives. So far as the plant's capacity for rendering efficient service to the buyer of service is concerned, it by no means follows that the plant has depreciated to the extent of the balance to the credit of the reserve, and that this amount, or any amount, should be deducted from the appraised cost to reproduce the plant new. On the contrary, the fact that such a renewal reserve is being maintained is the strongest argument that all that is possible is being done to provide against impairment of investment and impairment of service efficiency.

The liability to renew or replace the plant rests upon the proprietors; and here is the best indication that this liability is recognized and provided for.

Let us now consider a case of appraisal of plant for rate fixing. We will assume that the plant is being maintained in efficient condition through repairs and minor renewals paid for from current income; that final renewals are being made as required and the cost debited to the final renewal reserve; and that we are debiting each year to loss and gain and crediting to final renewal reserve, the amount indicated by the estimate based upon the expectation-of-life of the several groups of plant. Of course, it is to be understood that where reserve is credited on account of liability for future renewals, when those renewals are made the expenditures therefor should be charged against reserve and not against the year s operating expense. I emphasize this point because some have been misled by thinking that we propose to build up the reserve indefinitely.

Now let us further assume that the appraisal of plant for rate fixing is in continuous operation, and that depreciation is to be deducted as indicated by our table of expectations-of-life for the several parts of plant, and as advocated, unfortunately, by some commissions and courts, and not always opposed by those responsible for the protection of investments. The result would be the eventual elimination of all the investment in plant. For as each life group of plant reached the age at which the tables declared it was to be renewed or replaced, the deduction for "accrued depreciation" would equal the original cost. So as each group of parts of plant came to the time for renewal or replacement, that portion of the investment would be deducted from the plant appraisal, and there would be no provision for re-establishing the assets, because expenditures for repairs, renewals, or replacement cannot, as a general proposition, be capitalized.

I say here "as a general proposition." I leave the way open for exceptional cases, such as the rapid and abnormal obsolescence experienced in the development of the electric lighting and electric railway industries. Here the allowed rates of charge for service were not sufficient to pay a "fair return" on the investment and maintain the integrity of the investment. To require the proprietors to meet the total renewal charge in such a case would spell confiscation.

Now let us consider specifically certain questions which are raised in our rate fixing cases, and which trouble even some of the lawyers and experts appearing for the companies.

Question No. 1.—If you are not willing to deduct for "depreciation" in your appraisals of plant, why do you claim the right to include an item for "depreciation" in the cost of gas?

Answer.—The income from the operation of the property should first pay all items of operating cost, including administrative charges, taxes, and the maintenance of the integrity of original and supplementary investment. The cost of the final renewals or replacements of plant, as well as the repairs and minor renewals currently made, must, then, be paid for from income. This means that the cost of final renewals—or what is usually called estimated, accrued, or theoretical depreciation—is an item to be included first or last in the cost of gas.

As the cost of final renewals does not generally fall evenly on the succeeding years, we may estimate the cost thereof and divide it evenly over the years involved. Unless this is done, the cost for the year or years under examination may be below the average, by reason of the non-inclusion of the year's proportion of cost of final renewals and replacements. Or, it might happen, if there had been expenditures for final renewals or replacements far above the average, that the cost of gas might be unduly high. In either case, the rate of charge would be based upon an incorrect statement of average cost. This serves to explain why some companies are now properly including in their statements of cost an item to cover the cost of final renewals, although they did not include such an item before the days of rate regulation. The mere fact that the effort is made to spread this item of cost over the years involved is no argument one way or the other for a deduction for depreciation in the case of a plant which is being properly maintained and is rendering efficient service. This is a legitimate item of cost; and the item being acknowledged as a charge against income, the liability rests against the proprietors, whether or not a reserve is established, to meet this liability.

This point was well made in a brief on this subject by Charles F. Mathewson, of the New York Bar, in the case of Kings County Lighting Company v. The Public Service Commission for the First District of New York. Mr. Mathewson was the trial lawyer for the Company in the celebrated New York Consolidated Gas Company case. The brief now quoted from considers this question chiefly from the legal standpoint. It is the most logical paper on this subject I have ever read. Mr. Mathewson says:

The proposition [to deduct "accrued depreciation" in valuing plants in rate-making] is so absurd on its face that it hardly needs discussion to show its fallacy. Why, aside from the question of "confiscation," should consumers, for exactly the same service, equally efficiently rendered, expect to pay less in the sixth year than in the first year, merely because some items of plant will (viewed at the sixth year) require replacement at a date in the future then nearer than such date was at the beginning of operation? As well might it be claimed, to repeat a homely illustration, that a farmer should regulate the price of the eggs which he sells by the age of the hen which lays them—reducing the price of the product as the hen gets on in years. The reason he does not is that the service efficiency and operating value of the hen, as evidenced by the quality of the eggs which she lays, are not impaired by the fact that her life is advancing. That advancement may concern the farmer and possibly concerns the hen; but it in no manner affects the value of the eggs to the consumer, or justifies him in demanding them at a lower price than he paid at an earlier period of her life. The consumer of the eggs must expect to pay a sufficient price to afford a return to the farmer on his total investment in the hen during her life, *plus* enough more to enable the farmer on her death to replace her and thus keep his investment unimpaired. A farmer could hardly be expected to invest in hens for the purpose of supplying the public with eggs, if for a portion of their life he was to receive a return on only a third or a half of his investment; and any such rule would simply compel the public to go without eggs until the regulating power (if such there were) saw fit to revise its reasoning. There is absolutely no difference in the economic principles applicable to the operation of a gas plant and the operation of a hennery, so far as concerns right to return on capital; and what is absurd in one case is equally absurd in the other. The fact that the rate of return in the one case is subject to reasonable regulation, and not in the other case, has no bearing on the main proposition.

This question can be further answered by the statement that, if the final renewals were so evenly distributed over the years as to make a practically uniform annual charge, there would be no occasion for a renewal reserve, and there would be no occasion for raising this question. For instance, suppose we bring into the shop for testing and repairing such a number of consumers' meters that the whole number in service is completely overhauled in sequence every five years. Each meter is examined, cleaned, parts repaired or renewed as found necessary, or condemned and replaced by a new meter. The cost of all this work, including the new meters to replace those condemned, is charged each year into the cost of distribution, and so into loss and gain.

Here there would be no need for any additional item to be included in operating cost to cover final renewals of this portion of the plant. The cost of maintenance and final renewals would thus be more accurately distributed over the years than by means of any estimate based upon expectation-of-life. Furthermore, the plant would be so maintained to the highest possible degree of service efficiency. Certain experts of reputation have, unfortunately, taken the position with regard to plant so maintained by approximately uniform renewals that depreciation should be deducted from the appraised cost to reproduce new.

As further examples we may consider the ties of a railroad or the poles of a telegraph company. The assumption has been made that these would have a 10-years life, and that one-tenth of the total number would be replaced each year. Then it has been assumed that the average *age* of these ties or poles will be 5 years, and so there is a 50 per cent. depreciation which, in a rate-fixing case, must be deducted from the cost to reproduce the plant new. As a question of averages, the statement may be correct. As a basis for deducting 50 per cent. from the investment in this portion of the plant, it is without the slightest warrant in equity or common sense. This procedure deprives the investor of return upon one-half of his investment in this portion of the plant, and so works confiscation. And this though the utmost that can be done is being done to maintain the service efficiency of the plant! And the service efficiency is the only feature in this connection in which the buyer of service has any just claim for consideration. A certain authority has recently stated that a railroad soon after being put into operation will suffer a depreciation of 15 per cent., and thereafter it can be maintained at 85 per cent. of its original cost by adequate current expenditure for maintenance.

In each of these cases, if there is of necessity a deduction to be made from the original cost to cover "depreciation," a deduction which cannot be avoided by entirely adequate expenditures for replacements, then an amount equal to the deduction for depreciation should be added to the appraisal as one of the necessary items of cost, on the same basis as interest during construction and the many other items other than material and labor as already mentioned. Certainly there is no reason, under these circumstances, including the maintenence of service efficiency, why the investor should submit to any such wholesale confiscation or to any confiscation, however small.

It may happen that the whole question of "depreciation" may be cared for by the approximately uniform annual expenditures for final renewals. This condition is not infrequently to be found in the case of properties which are scattered over a number of locations, or have been built at different times widely apart. We have such cases in the United States, and I have no doubt there are many in Great Britain.

Question No. 2.—Having established a sinking fund to cover accruing and accrued depreciation (final renewals), why, in a rate making case, should you not deduct correspondingly from the reproduction cost (new) of plant?

Answer.—Practically this is Question No. 1 turned around; but it approaches the difficulty from another point of view.

It has already been shown that the final renewal sinking fund is established to spread more uniformly over the life of the plant the cost of final renewals of the several parts of the plant. The establishing of the fund indicates a definite purpose to maintain the plant from income, and hence shows that there is no occasion to depreciate the investment in plant. This fund, whether invested in securities or additions to plant, claims its own earnings or interest accumulations to complete the amount required for renewals. Hence its earnings are appropriated in advance as a charge against income, and the fund cannot be taken as an offset to depreciation. If depreciation were deducted, the earnings from this portion of the investment indicated by the depreciation deduction would be eliminated, and so the investment to that extent would be confiscated.

Question No. 3.—If plant extensio s have been made from the accumulations in the final renewal sinking fund, why should these additions to plant be included in the inventory of plant to be appraised for rate making case, and why should these extensions not be treated as duplications of capital investment?

Answer.—This is a special case under Question No. 2. When the "depreciation" sinking fund is drawn upon to pay for extensions or betterments, the amount is loaned from the credit balance of "depreciation" reserve, which balance is the accumulation remaining after the payments for the final renewals which have been made against the reserve. Here it is to be remembered that this reserve is being added to annually by the charges to operating cost and interest on accumulations, and is being reduced from time-to-time as the parts of plant included in the expectation-of-life table come to be renewed or replaced.

Then all parts of plant which appear in the inventory or appraisal as having been paid for from the depreciation reserve fall in one of two classes:

1. Parts whtch have been installed as renewals or replacements, and are, therefore, in place of parts represented in the original investment, and hence to be included in the inventory as such.

2. Parts of plant which have been installed as extensions or betterments, and which have been paid for by money borrowed from the depreciation reserve. These parts should, therefore, be included in the inventory and appraisal because they are not a duplication of investment, but represent additional investment.

As has been shown, the balance to depreciation reserve should be credited each year with interest at the rate agreed upon. The money so borrowed has to be returned when required for final renewals, and must be repaid from capital. In the meantime, the company has been able to defer the day for permanent financing. These extensions can be considered as capital investments; the amounts borrowed from depreciation reserve, with interest thereon, standing as a liability against the proprietors. In this connection, the point may be again made that, whether there is a depreciation reserve or not, the liability for renewals rests against the proprietors.

As to whether there shall be a depreciation reserve or not concerns the proprietors, and in no way concerns the public or the consumer. In any case, the cost of final renewals must be paid from income; and it can work no hardship to divide this cost as uniformly as possible over the years of service. This could be done by estimating the cost per 1,000 cubic feet without necessarily making any journal entries. The journal entries, and all that follows, are simply steps in accounting which make for greater accuracy and permit at any time the regulating authority to check up the methods pursued. If the plant is not so maintained as to give efficient service, either by failure to make repairs and minor renewals from current income, or later to make final renewals, the liability rests upon the proprietors, and cen be enforced by the regulating authority.

If the deductions were made from the appraisal of plant to cover neglected repairs or renewals, and then the deficiencies, under the orders of the commission, were made good, the investment would remain impaired, and so there would be confiscation. If the price were fixed on the basis of this valuation, so reduced by depreciation deduction, then the price so reduced would not be sufficient to give a fair return upon the entire necessary investment. If extensions to plant were made after this reduction in price, the price then could not afford a fair return upon this undepreciated additional investment. The final outcome would be, if this confiscatory procedure were continued, that the plants so affected would not be extended, and the public to be served would suffer. If it is claimed that the rate of charge would be increased to meet this restoration of the plant, the answer is that it is much easier to reduce than to increase a price, and especially so as to the service rendered by a public service corporation.

As a certain member of one of our most influential commissions said recently in this connection: "We are representatives of the people." It might be suggested that, as our public service corporations are largely owned by the small investors, either directly or through banking agencies, the commissions, if they are to protect all the people, should be encouraged to act impartially between the sellers and the buyers of service.

Our confidence as to the future is increased by the knowledge that some of our commissioners are strong enough and fair enough to take this position; and the number is increasing. One notable case can be referred to, of a man who went into office avowedly opposed to public service corporations, believing them to be what the interested politicians accused them of being, but at the end of his five years of very active service, publicly declared that he had found greater fairness, candor and honesty with the corporations' representatives than with the representatives of the people.

Question No. 4.—In the making of plant appraisals for any purpose, should present actual depreciation be measured by reference to tables of expectation-of-life prepared for estimating accruing liability for final renewals, together with the ascertained present age of the plant?

Answer.—If what I have said so far is conceded, it follows that accrued liability referred to cannot be ascertained by reference to tables of averages computed from the study of plants dissimilar in many ways. Such an estimate of accrued liability, to support any claim to accuracy, must be based upon a careful and competent study, preferably extended through years, of the plant under examination.

If, then, we wish to know the condition of plant at any time, why refer to such tables? Why not examine the plant itself, having in mind its condition as to physical decay, obsolescence and inadequacy? Certainly, if we desired to learn the cost of an elaborate structure, we would not consult the preliminary estimates of the architects when we could have access to the treasurer's final and complete records.

Were it not for the fact that many prominent engineers are following the practice of using so-called standard tables in estimating present depreciation, deducting in proportion to the age of the plant, I should not think it necessary to treat this question seriously. This method, reduced to its simplest terms, is something as follows: A plant is assumed to have an average life of 50 years. The average age is found or assumed to be 25 years. Result, depreciation 50 per cent., investment impaired 50 per cent.

Perhaps it is unnecessary to say that the men who err most radically in this direction are book men, who have had little or no practice to balance their faulty or incomplete theories. In the United States, the professors of economies, and statisticians are much in evidence at present; and many of these men are striking examples of the "blind leading the blind." The recklessness of statement indulged in by some of these men, depending as they do upon the reading of books, often each other's books, is simply appalling. It is still more appalling when we reflect that a few of these men are teaching their destructive doctrines to the young men attending some of our prominent colleges and universities.

To determine the amount of actual depreciation of a plant presents many difficulties, and calls for superior capacity founded upon scientific attainments and broad and exact experience. This determination may be required in connection with a change in ownership, that it may be known what expenditures, in addition to the purchase price, are required to bring the plant up to the required productive capacity and efficiency. Or, it may be required to check up the accuracy of estimates on the cost of maintenance, including final renewals. Or, it may be required by a public service commission to test the justice of a complaint as to faulty service. In any case, the facts are to be learned by expert examination of the plant itself, having in mind physical decay, obsolescence, and inadequacy. If life tables are employed, they should be used with the utmost caution, and then only as a most general guide, and never by those who have not had adequate experience as constructors and operators. Perhaps the greatest danger in these tables is that they encourage those who are incompetent to think they are competent.

Question No. 5 (a question recently asked): Assume a plant that has cost $100,000; its average life, 40 years. At the end of the first year's operation there has been charged to loss and gain $2,500 (100,000 ÷ 40) as the year's proportion of depreciation, and a satisfactory dividend has been earned and paid to the shareholders. Then, as the shareholders have received a satisfactory return on their $100,000 invested and have also had returned to them $2,500 of their principal, what right have they to demand a return next year on more than $97,500?

Answer.—Like many of the questions asked by the cross-examiner, this question, either through design or failure to understand the principles involved, is based upon faulty premises, and involves an unwarranted assumption. Assuming that the proposition as to non-deduction for accrued depreciation is accepted, then if the average life were 40 years, $2,500 should not be charged to loss and gain to cover the year's depreciation; but there should be charged such a yearly payment only as through the operation of a sinking fund would be required to redeem $100,000 at the end of 40 years—and this for the purpose of renewing or replacing the plant. The end sought is so to maintain the plant as to maintain the integrity of the investment. The maintenance of the plant includes repairs, minor renewals, and final renewals. In this particular case, the amount so required for a 4 per cent. sinking fund would only be $1,050.

Whether or not $2,500 or $1,050 has been charged to loss and gain against income, this is not a return of part of the investment, because, when correctly estimated and computed, it is part of the cost of maintenance, and hence a charge against cost, quite as much so as repairs and minor renewals. [I apologize for repeating such a self-evident proposition, but it seems to be necessary.] Again, if the amount charged is $1,050, as it should be, this amount, and the succeeding payments, must be invested in one way or another so that the earnings or interest on the annual payments may also be added to the fund to produce the required $100,000. When we bear in mind that for a 40 year's amortization at 4 per cent. the forty annual payments only aggregate (1.05 × 40 =) 42 per $100, and the interest accumulations have to produce the required remaining $58, perhaps we can better appreciate that the annual renewal reserve payments cannot work as earners of dividends for the stockholders; but they have their separate work to do for the stockholders in earning interest to be applied to the protectior of the investment.

It is to be remembered by those who are puzzled by Question No. 5 that the $100,000 plant must continue to be a $100,000 producer of service year by year, If depreciated to $90,000 at the end of the fourth year, only a $90,000 service should be expected then from its operation; at the end of the 39th year, only a $2,500 service should be required from its operation.

Over and over again the question is raised in one form or another: If the consumer has been charged for depreciation in the rates, why should he be charged again through failure to deduct for depreciation? The depreciation, or cost of final renewals, is part of the operating cost; and there would be just as much reason for reducing the investment because certain amounts have been charged into operating cost for coal, wages, salaries, etc., as there would be for reducing the investment in plant because the cost of maintenance has been included as part of that cost.

Finally, nothing that I have said as to the determination of actual "depreciation" is to be taken as an admission that in a rate fixing case any deduction should be made from the appraised cost to reproduce plant new to cover so-called accrued depreciation, or, more correctly speaking, the accrued liability against the stockholders for final renewals or replacements. This is a liability resting against the proprietors; and they must be given the normal opportunities to meet this liability without in the meantime suffering confiscation of investment by anticipation of the dates when the several payments to meet this liability may fall due. It is the part of wisdom for the owners of properties to reserve from income *all* that may be required to preserve intact their property investments; but this establishes no reason for deductions for depreciation in connection with rate fixing.

If, however, the Public Service Companies are to be required by the Commissions and Courts to face a demand for deduction for estimated accrued depreciation, then ordinary prudence suggests that there should be charged up for such depreciation each year the amount found by dividing the cost of plant by the estimated average life; that is, "straight line depreciation."

Let us hope that the Commissions and Courts may be convinced of the justice of the proposition herein presented, that is, estimated depreciation charged on the sinking fund basis, and then no deduction from appraised value for depreciation so accrued on effective plant.

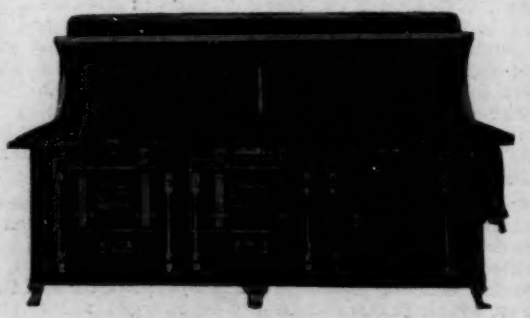
New Methods and Appliances.

THE ATLANTA (GA.) GAS COMPANY'S METHOD.—This advertisement (as it originally appeared in "The Southern Hotel Journal," the space taken up is probably 75 per cent. larger than this reproduction)

THE SOUTHERN HOTEL JOURNAL

ECLIPSE HOT BLAST

Installed in the New Kimball



The Modern Hotel Range

Every hotel man should see this range at once, as it is the most convenient and economical hotel appliance ever brought out. You are cordially invited to make an inspection and see us for prices

Atlanta Gas Light Company

Main 4945

shows one of the methods adopted by Mr. J. C. Rushin, of the Atlanta Gas Company, in bidding for the kitchen fuel supply of the hotels in "live Atlanta."

IMPROVED METHODS OF MANUFACTURING MONEL RUSTLESS METAL.—This alloy gives a product of very uniform composition, analyses of different varieties only varying between the limits: Nickel, 67.55 to 69.54 per cent.; copper, 26.25 to 27.53 per cent.; carbon, 0.17 to 0.44 per cent., and iron, 2.07 to 3.33 per cent. In forged or rolled metal the manganese varies from 1.26 to 1.82 per cent., and the silicon from 0 to 0.37 per cent., while in cast metal the manganese varies from 0.09 to 0.49 per cent., and the silicon from 1.08 to 1.41 per cent. Variations in mechanical properties have little relation to variations in composition. Carbon appears to strengthen the alloy; iron hardens, whitens and increases the strength, but appears to reduce the elastic limit. Silicon and manganese do not materially affect the physical properties, but manganese may correct the action of sulphur, which is probably present. The alloy resembles nickel in color, it machines well, and takes a high polish and retains it indefinitely. It melts at 1,360° C.; has a specific gravity of 8.87 and a hardness number of 20 to 27 on the Shore Scale. It is magnetic and absorbs carbon, which can exist in it both free and combined. Compared with nickel and copper its mechanical properties are:

	Copper Rolled.	Nickel Rolled.	Monel Metal Cast.	Monel Metal Rolled.	Monel Metal Annealed.
Tensile strength, lbs. per sq. in	34,000	75,500	85,000	100,000	110,000
Elastic limit, lbs. per sq. in	18,000	21,000	40,000	50,000	80,000
Elongation, per cent. in 2 inches	52	43.9	25	30	25
Contraction, per ct.	57	57	25	50	50
Modulus of elasticity	..	..	22,000,000 to 23,000,000		

Monel metal resists corrosion by sea water, superheated steam and chemical solutions, about as well as Parson's manganese bronze, phosphor bronze and Tobin bronze. There is no difficulty in forging and rolling it, but on account of its high melting point and power of dissolving gases special precautions are needed in making sand castings, somewhat similar to those necessary for making steel castings. These uses are suggested: Pump cylinders for sea water, propellers, rudders, mining screens, valves and plumbing fixtures subject to corrosive influences.

BENDING CAST IRON PIPES.—Owing to an oversight, says the "Engineering Record," no bends or sleeves were ordered for a line of cast iron water line which it had been decided to lay from the Guayabo river to the town of Preston, Cuba. The canon through which the pipe passes is crooked, rendering impossible such easy curves as could be made in the pipe joints. As it might have taken several months to secure additional special pipes, the local engineer decided to bend some of the straight pipe. The Cuban workers had frequently bent steel or wrought iron pipes at their sugar mills, and they followed the same course of procedure with the cast iron pipe with entire success, as they did not break or spoil a single length. The pipes were bent to various radii—the shortest being 50 feet. A cradle of old rails was first constructed with the desired amount of curvature, and a fire of hardwood built under and around the pipes. Six or 8 pipes were bent at a time. In from 1½ to 2 hours after starting the fires, the pipes were hot enough to bend and settle under their own weight on to the cradle prepared for them. They were 10 inches in diameter, with a $\frac{5}{16}$th-inch thick shell, and weighed about 760 pounds per 12 feet length.

Items of Interest
FROM VARIOUS LOCALITIES.

THE Gas Machinery Company, of Cleveland, O., has in hand orders for furnishing benches, carrying sectional silica retorts and settings, at the following named places: Baraboo, Wis.; Amsterdam, N. Y.; Fort Dodge, Ia. The same contractor will install two benches of inclined sectional silica retorts and settings in the plant of the Mobile (Ala.) Company. This latter will constitute the third furnishing of silica retorts to the order of the named corporation.

MR. GEORGE E. SMITH, Auditor for the Utah Gas and Coke Company, of Salt Lake City, has been promoted to the position of Assistant General Auditor to the American Public Utilities Company, with headquarters in Grand Rapids, Mich. Mr. E. A. Hancock succeeds to the vacancy caused by the promotion of Mr. Smith.

DURING the year the proprietors of the El Paso (Tex.) Gas Company expended $60,000 on betterment account. The major portion of the sum was invested in a storage holder located in what is known as the Santa Fe addition—it is up to retaining half million cubic feet—and in the placing of 5 miles of distributing mains. The Company supplies gas to 5,440 separate consumers, a gain of 496 during the twelvemonth, and well over 4,000 ranges, cookers, heaters, etc., are in service.

WE regret very much to have to report that severe personal injuries were sustained some days ago by Mr. John G. Pew, President of the Hope Natural Gas Company, by the overturning of an automobile while attempting to make a train on the Norfolk and Western Railroad. The accident occurred while passing through Louisa, Lawrence county, Ky. Mr. Pew was accompanied by Mr. F. L. Hadley, Superintendent of Construction to the Company, and Mr. L. W. Meek, also of the Company. The party had been out inspecting the lines. The others were injured more or less, but the worst sufferer was Mr. Pew. The physicians in charge say that, while it will be quite some time before Mr. Pew's wounds are healed, his recovery is assured.

THE electrical distribution division of the Louisville (Ky.) Gas and Electric Company has been quartered in the old plant (Seventh street and Ormsby avenue) of the Kentucky Heating Company. Capt. W. O. Smith, for many years in activity with the former Louisville Lighting Company, is now in charge of the distribution divisions (both gas and electric) of the Company.

"MR. MC. D. DEXTER, of the Columbus (Ga.) Gas Light Company, has mapped, and is carrying out, a scheme of main extensions, that will give gas to the residents of the Wynnton and Wildwood Park Sections, the growth of which is really remarkable. Mr. Dexter's associates say that it will be no fault of theirs if the residents of the outlying rections of Columbus fail to get 'all the comforts of home.' His sensible way of doing things has greatly increased the use of gas on kitchen account.—V. L. M."

Od the 4th instant Director Cooke, of the Department of Public Works, Philadelphia, opened the box for the reception of tenders for the gasoline lighting of the streets not reached by gas mains. There were no bids made. This was likely caused by the determination of Hollis Godfrey, Chief of the Gas Bureau, to have the street lighting contracts arranged on a payment basis according to the illumination furnished or yielded, rather than having the same based on the lamps used, or energy or fuel furnished.

MANAGER W. T. WALKER, of the Beaumont (Tex.) Gas Light Company, is now saying to himself, "Persistency thou art a jewel!" And he was consistent in his persistence the last 2 years over convincing the Company's proprietors that a rate schedule revision would be in accord with good business policy. In any event on the 1st inst.

his Directors authorized him to put the gross-net price at $1.25 (instead of $1.40) per 1,000, with a sliding scale of discounts, based on monthly volume of consumption. Good for Mr. Walker.

"B. W.," writing from Traverse City, Mich., under date of the 3d inst., respecting the operation there of the "Record-Eagle Cooking School," incloses the following: "In addition to the interesting lectures and demonstrations of how to reduce the high cost of living, and the really clever suggestions along culinary lines which are making the cooking school the great success it is proving to be, there is another feature of particular interest to those who attend. One of the local institutions (one that has always been foremost in catering to the home needs of its patrons), the exhibit of which is constantly being inspected by numbers of visitors, is the display being made by the Traverse City Gas Company. Its exhibit includes ranges, water heaters, gas irons, toasters, egg cookers and many utensils that are the necessities of every kitchen. In fact, it is both an interesting and instructive display, and cannot fail to effect an educational influence on the minds of the observing examiners. The Company has connected to the gas supply service an up-to-date Cabinet type of gas range, and on it, in full view of the visitors, an expert demonstrator (Miss Ainsworth) gives practical illustration of the attractive possibilities of cooking by gas The range itself is to be awarded finally to the woman who bakes a cake thereon, that will eventually be determined by a 'committee of experts' as the 'best cake entered in the tournament'—shall I say."

Mr. S. H. Roseberry, Secretary to Messrs. Kuemmerle & Co., of Philadelphia, recently visited Waterville, Me., with a view to planning the initial work in connection with the Kennebec Gas and Fuel Company. This concern is organized with a view to supplying gas to the settlements of Waterville, Fairfield, Oakland, Winslow, Vassalboro and Skowhegan, for lighting and cooking purposes. As a result of his visit, we understand that land has been chosen for the location of the plant in Waterville, and that work will be at once undertaken in connection with the distribution system, but that plant construction proper will not be commenced until next spring. The named places combined have a population not far from 14,000, and the supply to all of them can be readily carried on from the central station in Waterville.

"L. B. S.," writing from Spokane, Wash., under recent date, says: "Towards the end of August many of the friends and former business associates of Mr. Arthur N. Cantril, General Manager of the Spokane Falls Gas Light Company since 1909, tendered him a farewell dinner; as you have formerly noted in the Journal, Mr. Cantril goes to Hutchinson, Kas., there to assume charge of the properties of the United Light and Railways Company. The dinner was served in the 'Hall of the Doges,' otherwise Davenport's. The guests numbered 63, representatives of the 'Spokane,' 'Inland,' 'Rotary,' and the 'Ad.' Clubs, also from the Chamber of Commerce, were present. The Toastmaster was Mr. E. F. Cartier van Dissel, and Mr. Cantril surely must have been quite sure, from the nature of the speeches delivered, that by his course in Spokane he had lodged himself firmly in the esteem of his associates and brother citizens."

The City Solicitor of Sandusky, O., has drafted a rather drastic ordinance in respect of the rate schedule that the Sandusky Gas and Electric Company may follow, from December 7th next. The ordinance was to become operative December 7th, and its limitation was fixed for December 31, 1915. Under it the Company (it has supplied natural gas for some time) may not charge in excess of 25 cents per 1,000 gross, or 20 cents net (prompt payment), and it may not charge anything for meter rentals. When the ordinance was presented, Councilman Graefe moved its reference to the Ordinance and Franchise Committee, and was immediately taken to task by some of his associates, who de ired to railroad the act forthwith. His reply to the railroaders, however, was that the Company "Should be given opportunity to come before the Council to urge any objection to or offer sufficient reason why the ordinance should not become operative." Under his action the matter had to take its regular place on the calendar.

The Easthampton (Mass.) Gas Company has determined to decline to do any outside work in connection with its supplying of electric current. Hitherto, at a customer's request, it would wire and fit up any premises on such account. The department so maintained has been disbanded; but the man formerly in charge of it (Mr. W. C. Manning) has established offices on Liberty street, and has announced his readiness to take up the work at the point the Com pany ceased to go on with it. The Company, however, will still carry in its showrooms a complete line of lamps, fixtures and general supplies.

Last Wednesday Commissioner Hodson (Public Service Commission, Second New York District) sat in Syracuse to take testimony in relation to the application of the Syracuse Suburban Gas Company, for permission to lay mains and service pipes in and under certain highways in the town of De Witt, Onondaga county; also, to pray for approval of the exercise of a franchise therefor received by said Company from the Town Board and Superintendent of Highways of De Witt.

It is reported that certain financiers of Pueblo, Col., have applied to the authorities of La Junta, Col., for the right to there construct and operate a gas plant. The applicants are representing a corporation known as the Rocky Mountain Gas Company, who estimate that the expenditure involved will not be less than $50,000. This place is the capital seat of Otero county, Col., and is located on the Arkansas river, and on the Atchison, Topeka and Santa Fe Railroad, at a point 64 miles east southeast of Pueblo. It is quite a business center, having railway shops, two or more grain elevators, two banks, several churches, a school system, etc. Its population (now about 7,000) has doubled in the past 7 years.

The State Assessors of Louisiana have been instructed to place a valuation on the franchises of public service corporations that do not come under the terms of the State Board of Appraisers. This instruction is issued to insure the taxation of all privately owned and operated gas, electric light and water works utilities.

"B. L. M.," writing from Beaumont, Tex., under date of the 6th inst., says: "I presume you have mentioned the cut in rates that became operative here the first of the month; but, even in such event, I send this from a recent issue of our local newspaper—the *Enterprise*—as an indication of how our Gas Company is regarded by 'a censor of persons and utilities:' 'When some time ago the hint was given that the Beaumont Gas Company had decided to reduce selling rates the impression prevailed that this step would not be taken until the first of the year. However, our advertising columns show that it will become effective to-morrow—the 1st September. The Company has a plant, fully equipped and complete in every detail, and more than adequate to supply gas to a city having double the population of Beaumont. It is because those in charge of the Company have faith in the future of Beaumont that they have constructed a manufacturing plant and distributing system on a scale guarding against contingencies; the 40 miles of mains stretching around and going through the entire city and its suburbs are proof thereof. The reduced base rate for each 1,000 cubic feet, up to 5,000 cubic feet, is $1.25, net, or 15 cents per 1,000 less than formerly charged. From 5,000 to 10,000 cubic feet is $1, net, per 1,000; and for all quantities over 10,000 cubic feet the net rate will be $1 per 1,000. In making these notable concessions the Beaumont Gas Company proves how well it is aware that the most satisfactory relations between producer and consumer are brought about by a mutual spirit of liberality, confidence and cooperation. It may be stated, as a foregone conclusion, that the outcome and result of such a policy cannot be other than profitable to all parties in interest."

It might be well in respect of the above to note that the Company took ½ page of space for one issue in all the leading newspapers (there are 4 or 5 of these) of the city to announce the concession. This merely by way of suggesting inferences.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,071,053. Burner for Combustible Gases. C. M. Hunter, London, England.

1,071,648. Gas Condenser. C. R. Miller, Woodlawn Borough, Pa., assignor, by mesne assignments, to Superior Gas Improvement Company, Pittsburgh, Pa.

1,071,875. Gas Purifying Apparatus. H. Buschei, Bochum, Germany.

1,072,072. Gas Water Heater. W. B. Bastian, Chicago, Ills., assignor to Bastian-Morley Company, Pierre, S. D.

1,072,098. Gas Producer. E. Dor-Delattre, Liege, Belgium.

The Market FOR GAS SECURITIES.

The quotations for Consolidated gas this morning (Friday) at the opening were 133 to 133½. We are informed by a member of one of the best investment brokerage houses in this city that one large New York corporation has, within the past 3 months absorbed close to 2,000 shares of Consolidated, at an average of 126½; further, there is quite a demand for small lots. The gain in output for the past 10 days has exceeded in percentage corresponding gains of or for the three prior years. The demand for city gas bonds continues active, and a further increase in the bid therefor is in evidence.

Brooklyn Union is at exactly like figures to those reported last week (127½ to 130), but actual transfers in the shares are very rare these days. The upward movement in Peoples, of Chicago, continues; and not only continues, but increases. Closing last week at 118 to 118½, it came in to-day at 124½ to 125, with sales this morning at 125. The figurers are at work with their pencillings in an attempt to mathematically discount the advantages that will come to shareholders of record when the new stock issue shall be an accomplished fact. The essence of the figuring puts the gain at 17 to 20 points, wherefore Peoples shares should pass 30 on this rise. The JOURNAL predicted some months ago what would likely follow the promotion of Mr. Sullivan to the post of conserving the Company's political—so-to-write—attachings. Mr. Sullivan is a rare bird, whose songs of policy are very soothing.

The clever policy pursued in the management of the Baltimore Consolidated Gas, Electric Light and Power Company are nicely reflected in its annual statement, for the twelvemonth ended June 30th. The net earnings are $3,151,792, as against $2,822,399 in 1912. The "surplus after charges" is also $169,000 in excess of the like for 1912.

The shareholders in the Electric Company, of America, will hold a meeting the 7th prox. for the purpose of dissolving the corporation. The ratification of the project means that each share will be exchanged one and four-tenth shares in American Gas and Electric, and a cash disbursement of approximately 2½ per cent. The U. G. I. Company's regular quarterly of 2 per cent. is declared payable the 15th prox., and Cincinnati Gas and Electric is 70, bid.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

SEPTEMBER 15.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par alue of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	133	133½
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	3,500,000	1,000	101	103
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,500,000	100	157	157
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	[illegible]	63
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	98	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	100	102
Standard	5,000,000	100	102	104
Preferred	5,000,000	100	93	94
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	90	95
The Brooklyn Union	15,000,000	1,000	127½	130
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	180	—
Out-of-Town Companies.				
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	85	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,850,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	180	188
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	85	90
" Bonds, 5's	2,650,000	—	93	98
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	300,000	1,000	97	100
Cincinnati Gas and Electric				
Co.	29,500,000	100	87	90
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	98	103
Preferred	3,500,000	100	—	102½
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	120	130
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	91	91½
Preferred	25,000,000	100	89	90
Montreal L. H.& P., Canada	2,000,000	100	218	219
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	189	190
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	124½	125
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
Pacific Gas and Electric Co.	15,500,000	—	38	40
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	98	93
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	108
Extension, 6's	600,000	1,000	113¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
United Gas Imp. Co.	55,502,950	50	86	87
Washington (D. C.) Gas Co.	1,600,000	200	420	430
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting————1914. Officers: President, A. A. Dion, Ottawa; Secretary and Treasurer, John Keilior, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Gas Meeters.—Monthly Section Meetings; Grand Commissioner, Will. W. Barnes, East Orange, N. J.; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, W. H. Pettes; Secretary, G. E. Smith, Sipp Avenue, Jersey City, N. J. Philadelphia Section; Chairman, Stanley Grady; Secretary, H. E. Stiteler, Broad and Arch streets. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, T. W. Jennings, Boston; Sec., F. K. Wells, 60 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman. Bethlehem Section, Trueman Weithnecht, Chairman; Sec.-Treas., Truman Buss, South Bethlehem, Pa.

Guild of Gas Managers of New England.—Annual meeting, March, 1914. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Phimer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, Davenport, May 27, 28, 29, 1914; Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association—Annual meeting, September 17, 18 and 19, 1913. Detroit. Officers: President, W. S. Blauvelt, Detroit, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1914; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913; Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, St. Louis, Mo., May 19 and 20, 1914; Officers: President, E. L. Brundrett, Kansas City, Mo.; Secy-Treas., T. Clive Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914, Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, July —, 1913, Asbury Park N. J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N. J.

Ohio Gas Association.—Annual meeting, February ——— 1914 Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City May, ——1914. President, F. E. Bowman, Ada; Secretary-Treasurer, H. V. Bozo Oklahoma City.

Pacific Coast Gas Association.—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ———, 1914; Officers, President, J. A. Frick, Allentown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, Mobile, Ala., April 4, 1914, Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May———— 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May ————1914, Milwaukee, Wis. Officers: President, Ewald Haase, Milwaukee, Wis.; Secretary-Treasurer, Henry Harman, Milwaukee, Wis.